

**Investigating neighbourhood determinants of individual alcohol
use: A mixed methods study**

Jessica J. Smith

A thesis submitted in partial fulfilment of the requirements of Liverpool John Moores
University for the degree of Doctor of Philosophy

February 2025

Abstract

Neighbourhoods and the resources embedded within them may be important determinants of alcohol and mental health outcomes. Previous research suggests that neighbourhood social capital (NSC) protects against mental distress but there are mixed and inconclusive findings in relation to alcohol use. This mixed methods programme of research used a three-stage sequential design to investigate the role of NSC in determining individual-level alcohol use. A systematic review and theory synthesis examined the association between NSC and alcohol use and established potential mechanisms underlying this relationship to develop a novel conceptual framework. Latent class growth analysis identified a six-class model of drinking trajectories in a large sample of the English general population (n=22,880) and examined associations of class membership with sociodemographic characteristics, mental health, and neighbourhood factors. Neighbourhood barriers and facilitators of drinking reductions and abstinence were explored through photo-elicitation interviews with Merseyside (UK) residents who were current and former drinkers. Triangulation of findings from the three studies suggests there are complex and mixed associations between NSC and alcohol use. The findings confirmed that NSC is an important determinant of alcohol consumption and drinking practices. Theoretical and empirical insights from this programme of work showed that higher levels of NSC may promote moderate drinking via increased opportunities for drinking and conformity to drinking norms. However, NSC can also reduce drinking and protect against alcohol use disorder through: combatting neighbourhood disorder and guiding socialisation to healthy norms, facilitating access to social support, information and resources, and affording opportunities to build psychosocial skills and supporting positive future prospects. Structural and cognitive dimensions of NSC differentially influence alcohol use trajectories and drinking practices, and mental health potentially plays a role in these relationships. Interventions to build NSC may be useful for tackling alcohol-related harms but the potential for these strategies to widen existing inequalities should be considered. Policies and interventions should address macro-level factors such as socioeconomic disadvantage and alcohol accessibility, which have implications for the development and maintenance of NSC. Increasing the visibility of alcohol-free recreational spaces may help to combat risky drinking norms and individual harms, as well as improve wellbeing more generally.

Acknowledgements

Firstly, I would like to thank my Director of Studies, Professor Harry Sumnall, for his advice, patience, and encouragement throughout this experience. You have inspired me to be a better researcher and to challenge myself academically. I would also like to thank my supervisors, Dr Laura Goodwin and Lisa Jones, for sharing their expertise and providing valuable feedback.

Thank you to my family and friends – particularly my parents and brother, James – for always being supportive and instilling confidence in me. You have helped me to overcome anxieties and become more resilient. Thank you to my better half, Steph, for putting up with the long work nights, being the voice of reason, and for helping me to find joy and excitement in life even in the most stressful of times.

I would like to thank the Public Health and Psychology PGRs for making my PhD journey a positive one. I am especially grateful to Dr Anna Powell and Rebecca Kuiper for their friendship, much laughter, and reassurance during moments of self-doubt and hysteria. I am also thankful to Diane, Irina, Zoe B, Charlotte, Madeline, Zoe S and Evelyn for creating a supportive atmosphere at Exchange and all of the office pep talks.

Many thanks to the people who dedicated their time to participate in the photo-elicitation interviews and share valuable insights about their neighbourhoods. I am also grateful to the staff members at community centres and recovery groups who accommodated the workshops and interviews. Thanks to the Faculty of Health at Liverpool John Moores University for funding this PhD.

Finally, I would like to thank to my examiners – Dr Jennifer Germain and Dr Melissa Oldham – for making my viva an enjoyable experience and for their constructive feedback, which has helped me to improve this thesis.

Contents

Abstract.....	2
Acknowledgements.....	3
List of Figures	8
List of Tables	9
Abbreviations	11
CHAPTER 1: Introduction	13
1.1. Background and rationale	13
1.1.1. Prevalence and burden of alcohol use and related conditions	14
1.1.2. Identification, treatment, and management of alcohol use problems	16
1.1.3. Mental health and stress.....	22
1.1.4. Theories of alcohol use.....	26
1.1.5. Sociodemographic, socioeconomic, and geographic correlates of alcohol use and mental health problems	30
1.1.6. Socio-ecological models of alcohol use	31
1.1.7. Alcohol from a public health perspective: Upstream and downstream approaches to addressing alcohol harms.....	33
1.1.8. Neighbourhood environments as determinants of health and health-related behaviours: Conceptualisation, theorised processes, and rationale for further work	37
1.2. Neighbourhood social environments: Key theoretical concepts	41
1.2.1. Social cohesion	42
1.2.2. Social capital	43
1.2.3. Other relevant concepts: Neighbourhood disorder, social disorganisation, collective efficacy, and fear of crime.....	50
1.2.4. Social policy and social infrastructure	53
1.3. Impact of the COVID-19 pandemic	56
1.4. Aims and research objectives	58
1.5. Overview of the thesis	58
1.6. Position of the researcher	59
CHAPTER 2: General literature review	61
2.1. Aim of the literature review	61
2.2. Search strategy	61
2.3. Contextual-level variance in mental health and alcohol use.....	62
2.4. Deprivation and mental health	63
2.5. Deprivation and alcohol use.....	64
2.6. Neighbourhood features relevant to health	66
2.7. Social capital and mental health	68
2.8. Social capital and alcohol use.....	74

2.9. Methodological issues associated with neighbourhood research	79
2.10. Chapter summary	82
CHAPTER 3: Methodology	84
3.1. Research design and paradigm	84
3.2. Overview of the current approach to mixed methods research	85
3.3. Rationale for review and theory synthesis (Study 1)	88
3.4. Rationale for latent class growth analysis (Study 2)	89
3.5. Rationale for photo-elicitation interviews (Study 3)	93
3.6. Triangulation.....	99
CHAPTER 4: Theory synthesis and review investigating the associations and pathways of neighbourhood social factors and alcohol use (Study 1)	101
4.1. Introduction.....	101
4.2. Methods.....	102
4.2.1. Methodological overview	102
4.2.2. Search strategy to identify theories.....	104
4.2.3. Eligibility criteria for theories	105
4.2.4. Search strategy to identify empirical studies	106
4.2.6. Study selection and eligibility criteria for studies	106
4.2.7. Quality assessment	108
4.3. Analytic approach	109
4.3.1. Constructing the framework and supporting narrative	110
4.4. Results	111
4.4.1. Overall sample.....	111
4.4.2. Theory papers	112
4.4.3. Empirical studies: characteristics and summary of findings.....	132
4.4.4. Quality assessment	137
4.5. Narrative summary of conceptual framework.....	137
4.5.1. Pathway 1: Psychosocial processes	139
4.5.2. Pathway 2: Social control and norms.....	141
4.5.3. Pathway 3: Diffusion of information and resources via social networks within the neighbourhood	146
4.6. Discussion.....	150
4.6.1. Strengths and limitations	152
4.6.2. Implications	153
4.7. Conclusion.....	154
CHAPTER 5: Study 2: Investigating longitudinal relationships between neighbourhood social factors and alcohol use trajectories in the English general population using latent class growth analysis	155

5.1. Aims and objectives.....	155
5.2. Methods.....	156
5.2.1. Study population.....	156
5.2.2. Measures.....	163
5.2.3. Data preparation and handling missing data.....	167
5.2.4. Statistical analysis	168
5.3. Results	171
5.3.1. Unconditional LCGA: Trajectory classes.....	172
5.3.2. Conditional LCGA: Predictors and covariates of class membership.....	178
5.3.3. Sensitivity analyses	180
5.3.4. Alcohol trajectory class membership as a predictor of mental health	184
5.4. Discussion	184
5.4.1. Strengths and limitations	190
5.4.2. Implications	193
5.5. Conclusion.....	194
CHAPTER 6: Using photo-elicitation interviews to explore barriers and facilitators of drinking reductions and abstinence in current and former drinkers residing in Merseyside, UK (Study 3)	195
6.1. Aim and objectives	195
6.2. Methods.....	196
6.2.1. Overview of methods	196
6.2.2. Research setting.....	196
6.2.3. Recruitment and sample	197
6.2.4. Self-report measures	198
6.2.5. Initial workshop and photography task.....	198
6.2.6. Individual semi-structured interviews	201
6.2.7. Ethics.....	202
6.2.8. Analytic approach	203
6.3. Results	204
6.3.1. Theme 1: Alcohol availability and accessibility.....	207
6.3.2. Theme 2: Dissatisfaction and stress related to the living environment	213
6.3.3. Theme 3: Accessibility and quality of amenities and services	217
6.3.4. Theme 4: Neighbourhood social cohesion	227
6.3.5. Theme 5: Neighbourhood socio-economic/demographic composition and neighbourhood identity	235
6.4. Discussion	247
6.4.1. Strengths and limitations	254
6.4.2. Implications	256

6.5. Conclusion.....	259
CHAPTER 7: Triangulation and general discussion	260
7.1. Triangulation protocol	260
7.2. Legitimation process.....	261
7.3. Triangulation of findings.....	265
7.5. Strengths and limitations	271
7.6. Recommendations for future research.....	273
7.7. Recommendations for policy and practice	275
7.8. Concluding remarks.....	277
References	278
Appendix 1 – Modified Newcastle-Ottawa Scale (cohort version) adapted from Wells et al (2011) for quality assessment of longitudinal studies included in Study 1.....	329
Appendix 2 – Modified Newcastle-Ottawa Scale (cross-sectional version) adapted from Modesti et al (2016) for quality assessment of cross-sectional studies included in Study 1331	
Appendix 3 – Quality assessment of empirical studies included in Study 1	333
Appendix 4 – Study 2 trajectory class characteristics	335
Appendix 5 – Ethical approval for Study 3.....	338
.....	343
Appendix 6 – Recruitment poster for Study 3	346
Appendix 7 – Participant Information Sheet – Version 1 (for current drinkers who have considered reducing their alcohol intake)	347
Appendix 8 – Participant Information Sheet – Version 2 (for participants recruited from recovery groups)	353
Appendix 9 – Participant Consent Form (used for both current drinkers and participants recruited from recovery groups)	359
Appendix 10 – Study 3 workshop materials.....	362
Appendix 11 – Reflexive notes for Study 3.....	370

List of Figures

Figure 1 - Stages of BFFS (Carroll et al, 2013)	104
Figure 2 - PRISMA flow diagram (Page et al, 2021) of the study selection process for empirical studies	113
Figure 3 - PRISMA flow diagram (Page et al, 2021) of the study selection process for papers that describe relevant theory	114
Figure 4 - Conceptual framework depicting the theorised pathways from neighbourhood social capital to individual alcohol use	149
Figure 5 - Participant selection process for LCGA	158
Figure 6 - Group-based AUDIT-C trajectories by wave	174
Figure 7 - Front (left) and back (right) of the cards displaying the three prompts for the photography task	201
Figure 8 - Thematic map illustrating themes and sub-themes	206
Figure 9 - Photograph from front door depicting proximity to an off-license and pub (Theme 1)	207
Figure 10 - Photograph of advertisement for "cheap" on-trade alcoholic beverages (Theme 1)	209
Figure 11 - Photograph of a nearby off-license that has cheap deals on alcohol (Theme 1)	210
Figure 12 - Photograph of alcohol "dressed up all Christmas-y" as a raffle prize in a supermarket (Theme 1)	211
Figure 13 - Photograph of an e-scooter that is publicly available in the neighbourhood and facilitates access to alcohol (Theme 1)	212
Figure 14 - Photograph depicting a lack of variety in neighbourhood amenities (Theme 2)	214
Figure 15 - Photograph of boarded up shops that create a depressing environment (Theme 2)	214
Figure 16 - Photograph of police in the street due to "neighbour disputes and things" (Theme 2)	214
Figure 17 - Photograph of a mobility scooter, which is difficult to use on broken pavements in the local area (Theme 2)	216
Figure 18 - Photograph of a pub that used to be "the bee's knees" prior to gang-related violence that occurred here (Theme 2)	217
Figure 19 - Photograph of a coffee shop, which facilitates low-effort socialising without alcohol (Theme 3)	219
Figure 20 - Photograph of a nearby alleyway littered with debris (Theme 3)	222
Figure 21 - Photograph of a canal that is "beautiful" and has a "very relaxed atmosphere" (Theme 3)	224
Figure 22 - Photograph of a "peaceful" park (Theme 3)	225
Figure 23 - Photograph depicting a park as a place to engage in physical activity and mindfulness (Theme 3)	225
Figure 24 - Photograph of a park that nobody uses because it is not looked after (Theme 3)	226
Figure 25 - Photograph of a street where neighbours can be cohesive as well as "toxic", and where there is sometimes exposure (and conformity) to polysubstance use norms (Theme 4)	229
Figure 26 - Photograph of a bus stop where a participant would consume alcohol to avoid drinking at home around their spouse (Theme 4)	233
Figure 27 - Photograph of a "School Zone" road sign, which is perceived to discourage heavy drinking (Theme 5)	237

Figure 28 - Photograph of a "hipster, urban development" with a "younger vibe", which is perceived positively (Theme 5)	240
Figure 29 - Photograph representing a strong link between pub sports (i.e. darts) and consuming alcohol (Theme 5)	242
Figure 30 - Photograph of "the wedding cake" monument described as "beautiful" (Theme 5)	243
Figure 31 - Photograph of a themed bar that is "like a museum" and embodies local history (Theme 5)	244
Figure 32 - Photograph of a mural illustrating "the past, where it was the Blitz, to the present" neighbourhood (Theme 5).....	245
Figure 33 - Photograph of a mural illustrating a successful football player from the neighbourhood, which inspires hope in residents - particularly youth (Theme 5)	245

List of Tables

Table 1 - Approaches, dimensions, and indicators of social capital.....	50
Table 2 - Literature review search terms	62
Table 3 - Search strategy for identifying theories using the BeHEMoTh template	105
Table 4 - Summary of eligibility criteria for primary (empirical) studies identified from systematic database searching.....	107
Table 5 - Characteristics of empirical quantitative studies and relevant findings	115
Table 6 - Summary of key theories that informed the development of the conceptual framework.....	139
Table 7 - Comparing the sociodemographic characteristics, NSC, and mental health of those with and without at least two waves of AUDIT-C data.....	160
Table 8 - Odds ratios for AUDIT-C missingness predicted from AUDIT-C item responses .	162
Table 9 - AUDIT-C response rates for the analytic sample	162
Table 10 - Prevalence of drinker types at each wave, according to the AUDIT-C classification system (i.e., positive screen for risky drinking = 5+)	163
Table 11 - Comparing Wave 11 participants who responded to AUDIT-C before and after March 2020	170
Table 12 - Goodness-of-fit statistics for unconditional multilevel models with 1-8 latent classes	173
Table 13 - Drinking characteristics of the trajectory classes at baseline and Wave 11 ^a	176
Table 14 - Comparison of goodness-of-fit statistics for models that include mental health assessed at Wave 7 and at Wave 6.....	180
Table 15 - Beta coefficients and standard errors for trajectory class characteristics analysed via multinomial logistic regression of latent class membership and covariates (reference group = "borderliners").....	181
Table 16 - Model fit statistics for unconditional models with 1-8 classes for the sub-sample of participants screening positive on the AUDIT-C at Wave 7.....	183
Table 17 - Distribution of mean GHQ scores between trajectory classes.....	184
Table 18 – Eligibility criteria and justifications	197
Table 19 - Sociodemographic and neighbourhood characteristics, mental health and alcohol use for the overall sample.....	205
Table 20 - Table of individual participant characteristics	205
Table 21 - Triangulation protocol adapted from Farmer et al (2006)	262
Table 22 - Application of the legitimization process	263

Table 23 - Triangulation (and level of convergence) of themes related to Objective 1: To examine the direction and strength of associations between NSC and individual alcohol use	265
Table 24 - Triangulation (and level of convergence) of themes related to Objective 2: To identify and explore the mechanisms and pathways linking NSC to alcohol use	268
Table 25 - Triangulation (and level of convergence) of themes related to Objective 3: To examine whether – and how – NSC predicts drinking practices and alcohol consumption trajectories	270

Abbreviations

ABCD – Assets-based community development
AUD – Alcohol use disorder
AUDIT – Alcohol Use Disorders Identification Test
AUDIT-C – Alcohol Use Disorders Identification Test – Consumption Module
BFFS – Best fit framework synthesis
CBPR – Community-based participatory research
CI – Confidence interval
CMD – Common mental disorder
COSMHAD - Co-occurring severe mental health problems and alcohol/drug use
COVID-19 – Coronavirus disease
DALY – Disability-adjusted life year
DSM – Diagnostic and Statistical Manual
GHQ – General Health Questionnaire
GMM – Growth mixture model(ling)
HED – Heavy episodic drinking
ICD – International Classification of Diseases
LC – Latent class
LCA – Latent class analysis
LCGA – Latent class growth analysis
LGCM – Latent growth curve model(ling)
LJMU – Liverpool John Moores University
NHS – National Health Service
N-OS - Newcastle-Ottawa Scale
NSC – Neighbourhood social capital
OR – Odds ratio
PAR – Participatory action research
PEI – Photo-elicitation interviews
PRISMA – Preferred Reporting Items for Systematic reviews and Meta-Analyses
RSOD – Risky single occasion drinking
SES – Socioeconomic status
UK – United Kingdom
US – United States
WHO – World Health Organization

Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning

CHAPTER 1: Introduction

1.1. Background and rationale

What matters more for your health: genetic code or postcode?

This line of inquiry has gained traction amongst health researchers (Arcaya et al, 2016; Braveman & Gottlieb, 2014) and is an emerging topic of debate outside of academia, being disseminated by news outlets such as Forbes and TIME Magazine (Ducharme & Wolfson, 2019; Lawry, 2022). In England, people residing in the least deprived areas live almost a decade longer than people residing in the most deprived areas (Bennett et al, 2018) and experience more years of good health free from illness and disability (Parker, Bucknall, Jagger & Wilkie, 2020; Smith, Olatunde & White, 2010). This can be partly explained by the socioeconomic patterning of health-behavioural risk, such as alcohol consumption, smoking and diet (Buck & Maguire, 2015). However, residents in the most disadvantaged areas typically drink at similar levels to those in the most affluent areas yet experience elevated rates of alcohol-related harm (Beard et al, 2016). Understanding contextual determinants of alcohol use is essential for tailoring public health interventions to tackle risky drinking, developing policies to prevent related harms, and reducing health inequalities. Previous research has shed light on the roles of the built environment, socioeconomic status (SES) and poverty in shaping behavioural health, but neighbourhood social environments have received relatively little attention (Arcaya et al, 2016).

The programme of research presented in this thesis examined neighbourhood social environments as potential determinants of alcohol use. The term “neighbourhood social environment” refers broadly to the social conditions of a neighbourhood, which may be defined by geographic, administrative and/or perceived boundaries. Specific social phenomena, such as social capital, may be embedded in neighbourhood social environments and are defined in detail throughout Section 1.2. Terms such as “neighbourhood factors” and “neighbourhood determinants” will be used to refer broadly to factors – physical, social, economic and/or demographic – that are embedded in neighbourhoods or which operate at the neighbourhood-level (rather than individual-level).

This chapter will highlight alcohol consumption as a public health priority, provide an overview of relevant treatment and policy approaches, introduce the concept of social capital, and

explain the rationale underpinning this work into the role of neighbourhood social environments in determining individual drinking behaviours.

The chapter is structured as follows:

- An overview of the prevalence and burden of alcohol use and related conditions to demonstrate the scale of the problem;
- A summary of approaches to diagnosing, treating and managing alcohol use problems;
- Consideration of the associations between alcohol use, mental health and stress;
- A brief introduction to theories and frameworks used to understand the drivers of alcohol involvement;
- A commentary on alcohol control policies, community initiatives, and social infrastructure;
- The rationale for focusing this thesis on neighbourhood social environments and their role in shaping drinking practices and mental health;
- An introduction to, and critique of, social capital and related concepts relevant to neighbourhood-health research;
- And finally, a short section regarding the impact of the COVID-19 pandemic on alcohol use, mental health, and neighbourhood social environments.

1.1.1. Prevalence and burden of alcohol use and related conditions

Globally, one in three people (32.5%) consume alcohol, which corresponds to approximately 2.4 billion drinkers (Griswold et al, 2018). Alcohol use constitutes a major economic and disease burden, ranking as the seventh leading risk factor overall for deaths and disability globally (Griswold et al, 2018). The most recent issue of the Global Burden of Disease study reported that, in 2021, high alcohol use emerged as the top leading risk factor for disability-adjusted life-years (DALYs, i.e. years lost to disability, poor health, or premature death) among 15-49 year olds, after ranking as the third leading risk factor in 2000 for this age group (Brauer et al, 2024). Although the Global Burden of Disease study documents an overall decline of 6.7% in alcohol-attributable DALYs between 2000-2021, this change is relatively smaller compared to that for other behavioural risk factors such as smoking (-19.3%) and unsafe sex (-44.3%). According to the World Health Organization (WHO) Global Status Report on Alcohol and Health (WHO, 2018), alcohol use was attributed to 3 million deaths (5.3% of all deaths) and 132.6 million disability-adjusted life years (DALYs) in the same year. The prevalence of alcohol use and related problems varies considerably by location, socioeconomic status (SES), cultural contexts, and demographic factors, with global figures suggesting that alcohol

consumption per capita is highest in European regions and lowest in the Middle East and North Africa (Peacock et al, 2018). Among individuals aged 15 to 49, alcohol use ranks as the top leading risk factor for premature death (Griswold et al, 2018) and, despite efforts to reduce global alcohol intake, per capita consumption is projected to rise to 7.6 litres by 2030 (from 6.5 litres in 2017 and 5.9 litres in 1990; Manthey et al, 2019).

There are more than 200 health conditions that have been attributed, at least partially, to alcohol use (WHO, 2018), which include liver cirrhosis and liver disease, unintentional and intentional injuries, cardiovascular diseases, cancers, pancreatitis, tuberculosis, human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS), as well as a range of neuropsychiatric and mental health disorders (Griswold et al, 2018; Peacock et al, 2018; Rehm, 2011). At least 25 diseases or conditions listed in the International Classification of Diseases (ICD-10) are wholly attributable to alcohol consumption (Shield, Parry & Rehm, 2014). Previous research has suggested that low-level drinking is associated with a lower risk of cardiovascular disease and mortality (de Gaetano & Costanzo, 2017; Di Castelnuovo et al, 2006), as demonstrated by J-shaped curves. However, more recent findings suggest that there is no “safe” level of alcohol consumption and so any potential “protective” effects of drinking are outweighed by health risks – particularly cancer (Griswold et al, 2018). Re-evaluations of the association between alcohol and mortality suggest that the J-shaped curve may have arisen because abstainers tend to have poorer health than drinkers, and this group may contain former drinkers who have quit drinking due to the health-damaging effects of alcohol, as posited by the “sick quitter hypothesis” (Sarich, Gao, Zhu, Canfell & Weber, 2024; Shaper, Wannamethee & Walker, 1988).

In addition to individual health risks, there are considerable societal harms associated with alcohol consumption. Studies of predominantly high-income countries suggest that the cost of alcohol consumption equates to between 1.3-2.7% of gross domestic product (GDP) (Manthey et al, 2021; Public Health England [PHE], 2016). This economic burden is primarily driven by productivity losses resulting from alcohol use, such as workplace absenteeism, unemployment, incarceration, early retirement, and premature death (Manthey et al, 2021). Alcohol is also implicated in a wide range of criminal and violent behaviours, and higher levels of intoxication are associated with more serious crimes (PHE, 2016). These behaviours include but are not limited to: physical and sexual assault, homicide, property damage and theft, driving under the influence, and being drunk and disorderly (PHE, 2016). In England, approximately 280,000 hospital admissions were attributable to alcohol use as the main reason in 2019/2020, which was a two percent increase from 2018/2019 and an eight percent increase from 2016/2017 (NHS Digital, 2022). This equates to 1.6% of all hospital admissions

in that year, with the most common primary diagnosis being cancer (28%) followed by mental and behavioural disorders due to alcohol use (14%). It is estimated that the total societal cost of alcohol use (in England) is more than £21billion annually, including £11billion accruing from alcohol-related crime and over £3billion in alcohol-related costs spent by the NHS (PHE, 2016). Meanwhile, other estimates suggest that the overall social cost of alcohol in England exceeds £50billion (Institute of Alcohol Studies, 2020). Even the more comprehensive analyses focus exclusively on the direct economic costs of alcohol and ignore intangible (negative) externalities, which include the suffering of others who are affected by an individual's drinking. Researchers have therefore argued that current approaches to measuring the social harms associated with alcohol are inadequate, and advocate for further development of metrics that can more effectively capture aspects of harm that are not reducible to economic costs (Room et al, 2010).

1.1.2. Identification, treatment, and management of alcohol use problems

1.1.2.1. Identification of alcohol use problems

Alcohol consumption patterns can be categorised as “hazardous” use, “harmful” use, or “dependence”, which reflect increasing levels of risk (National Institute of Health and Care Excellence [NICE], 2017). Hazardous alcohol use refers to drinking patterns that increase a person's risk of harm but have not yet caused harm. For example, hazardous drinking could describe exceeding the UK Chief Medical Officers' guidance, which is 14 units per week (one unit equals 10ml or 8g of pure alcohol) in the UK (Department of Health, 2016). Drinking patterns that are already causing harm physical or psychological harm can be categorised as harmful drinking. Guidance provided by NICE (2017) states that harmful drinking involves consumption of 35+ or 50+ units per week for women and men respectively. Alcohol dependence is defined as “cluster of behavioural, cognitive and physiological factors that typically include a strong desire to drink alcohol and difficulties in controlling its use” (NICE, 2017, p.12). Unlike hazardous drinking, which is considered a health risk factor but not a disorder, alcohol dependence is a clinical entity that constitutes a severe form of alcohol use disorder (Saunders, Degenhardt, Reed & Poznyak, 2019). “Binge drinking” broadly refers to drinking high quantities of alcohol over a short period of time and is typically defined as consuming four or five drinks in a single session for females and males respectively (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2023). Alternatively, the NIAAA also states that binge drinking can be defined as an alcohol consumption pattern that produces a blood alcohol concentration (BAC) of 0.08 grams per decilitre (NIAAA, 2023). Binge drinking,

which is analogous to “heavy episodic drinking” (HED) and “risky single occasion drinking” (RSOD), does not necessarily warrant a clinical diagnosis but is more often exhibited by drinkers who consume at hazardous, harmful, or dependent levels. Persistent heavy use is a major risk factor for developing alcohol use disorder (NIAAA, 2024). According to the Adult Psychiatric Morbidity Survey, it is estimated that 16.6% of adults exhibit hazardous drinking, 1.9% exhibit harmful drinking, and 1.2% exhibit probable dependence (McManus, Bebbington, Jenkins & Brugha, 2016). Hazardous drinking and more severe consumption patterns are more prevalent in men than in women (McManus et al, 2016). However, risky drinking amongst males declined between 2000 and 2014 but remained stable for females (McManus et al, 2016).

The Alcohol Use Disorders Identification Test (AUDIT) is a 10-item screening instrument used to screen for risky drinking and probable dependence (Babor, Higgins-Biddle, Saunders & Monteiro, 2001; Saunders, Aasland, Babor, de la Fuente & Grant, 1993). The AUDIT taps into alcohol consumption patterns (i.e., drinking quantity/frequency, binge drinking), symptoms of dependence (e.g. inability to stop drinking after consuming alcohol), and alcohol-related consequences (e.g. injury due to drinking). The tool demonstrates high reliability and has been validated for use in clinical and community settings, in the general population and specific demographic sub-populations, and internationally (Babor & Robaina, 2016; de Meneses-Gaya, Zuardi, Loureiro & Crippa, 2009; Higgins-Biddle & Babor, 2018; Reinert & Allen, 2007). A shortened three-item version of the AUDIT that includes only the questions on alcohol consumption, the AUDIT – Consumption (AUDIT-C), can more efficiently screen for risky drinking and performs similarly to the original AUDIT (Bradley et al, 2007; de Meneses-Gaya et al, 2009; Reinert & Allen, 2007). In a recent validation study, Khadjesari et al (2017) note that “the AUDIT-C is a measure of alcohol consumption, not harm” (p.9). Other validated tools used to detect problematic alcohol use include the CAGE questionnaire (Dhalla & Kopec, 2007; Ewing, 1984), which is an acronym for “cutting down”, “annoyance by criticism”, “guilty feelings” and “eye-openers”; the T-ACE, which replaces the CAGE question concerning guilt with “tolerance” (Sokol, Martier & Ager, 1989), and the Michigan Alcoholism Screening Test (MAST; Selzer, 1971).

Screening, brief intervention and referral to treatment (SBIRT) is an evidence-based approach to the identification and prevention of alcohol problems (Babor, Del Boca & Bray, 2017). Delivery of SBIRT can occur in a diverse range of clinical and non-clinical settings, including primary healthcare centres, emergency departments, schools, and via digital format (i.e., eHealth). The standard approach to SBIRT involves individuals completing a short screening tool – most often the AUDIT-C – which, for those screening positive for risky drinking, is

followed by brief intervention and referral to treatment if necessary. Brief intervention may entail personalised feedback and/or motivational interviewing and, depending on level of risk, the individual may be signposted to detoxification services, outpatient counselling, and/or mutual aid groups.

1.1.2.2. Alcohol use disorders

Alcohol use disorder (AUD) is often considered a “chronic relapsing brain disease” (Heilig et al, 2021; Volkow, Koob & McLellan, 2016) that typically first occurs in early adulthood (Grant et al, 2015). However, this biomedical approach to understanding AUD is challenged by the biopsychosocial model (see Section 1.1.4.) and evidence of “natural recovery” from AUD without formal treatment (see Section 1.1.2.3.). In the general population, AUD is linked to a two-fold increase in mortality risk compared to having no AUD (Roereke & Rehm, 2013). Global estimates of AUD prevalence among people aged 15 and above are 8.6% for males and 1.7% for females, and are greater in high- and middle-income countries than in low-income countries (Rehm & Shield, 2019). In 2019/2020, it was estimated that 608,416 adults in England had alcohol dependence, which corresponds to approximately 14 people with alcohol dependence for every 1,000 adults (Office for Health Improvement & Disparities, 2024).

The Diagnostic and Statistical Manual Fifth Edition (DSM-V; American Psychiatric Association, 2013; American Psychiatric Association, 2022) and the International Classification of Diseases 11th Revision (ICD-11; WHO, 2019a) are used to diagnose AUDs, with the former typically being used in the US and the latter often being used in other regions of the world, including in the UK. The DSM-V classifies alcohol problems along a spectrum of severity (mild, moderate, and severe), rather than two distinct conditions: ‘alcohol abuse’ and ‘alcohol dependence’, as recognised in the DSM-V’s predecessor, DSM-IV. Diagnosis of AUD requires at least two out of 11 criteria to be met within a 12-month period. These criteria relate to social and personal problems as a direct consequence of alcohol use, difficulty controlling intake, compulsion to drink, craving, tolerance, and withdrawal. The ICD-11 defines Alcohol Dependence as a “disorder of regulation” primarily characterised by an “internal drive” to use alcohol, and requires an individual to meet at least two out of the three key diagnostic guidelines: impaired control over alcohol use, alcohol use becoming an increasing priority over other important aspects of life (often in spite of repeated problems related to drinking), and physiological features (e.g. tolerance, withdrawal symptoms). Harmful alcohol use (i.e. “Harmful Pattern of

Use of Alcohol”) is also recognised in the ICD-11 as a “subdependence diagnosis” (Saunders, Degenhardt, Reed & Poznyak, 2019). A broader range of alcohol-related diagnoses are recognised in the ICD-11 than in its prior revision (ICD-10) and the DSM-V, such as Alcohol Withdrawal, acute or “transient” conditions (e.g. Alcohol Intoxication and Episode of Harmful Use of Alcohol), alcohol-induced mental disorders (e.g. Alcohol-induced Mood Disorder) and neurocognitive conditions (e.g. Alcohol-induced Dementia). Despite a substantial evidence base supporting the use of both diagnostic systems, AUDs identified by the DSM-V and ICD-11 are conceptually different and greater compatibility between the clinical entities would be beneficial for “enhancing accuracy in diagnosis and communication internationally” (p. 1629, Saunders et al, 2019).

1.1.2.3. Treatment of alcohol use disorders

Treatment for alcohol use disorders often involves pharmacological and/or behavioural intervention. Common pharmacological treatments for AUD include naltrexone, disulfiram and acamprosate, which are thought to act by increasing the aversive effects and/or counteracting the positive effects of drinking (Swift & Aston, 2015). However, there is mixed support for their effectiveness (Anton et al, 2006). Behavioural approaches to AUD treatment are typically guided by principles of cognitive-behavioural therapy (CBT), which aims to build coping skills and self-efficacy (a person’s belief in their ability to perform the necessary actions to accomplish a goal), recognise high-risk (drinking) situations, and target maladaptive coping behaviours such as alcohol consumption. Frequently used techniques that have received moderate to strong empirical support with respect to effectiveness are: motivational interviewing, contingency management, relapse prevention and fostering coping skills, mindfulness-based therapies and 12-step facilitation (DiClemente et al, 2017). In cases of alcohol dependence, drinking reductions or abrupt cessation can induce withdrawal symptoms such as tremors, anxiety, insomnia, fever, nausea, seizures, and delirium tremens. These withdrawal effects can be fatal if not properly managed so it may be necessary to undergo detoxification prior to treatments aiming to promote reduced use and abstinence. Assisted detoxification, typically carried out in residential or inpatient settings, often involves administration of benzodiazepines to ease withdrawal, although these drugs have dependence-producing potential themselves (Swift & Aston, 2015).

Most people with alcohol use problems do not seek or ever receive treatment (Grant et al, 2015; Mekonen et al, 2021), with only 18% of dependent drinkers in England engaging with treatment services (Alcohol Change UK, n.d.). This may be due to a range of socio-economic

and attitudinal barriers including for example, lack of access to services, financial constraints (particularly in countries that do not have a universal healthcare system), perceptions that alcohol problems will resolve without help, mistrust of healthcare systems, and stigma (Mojtabai, Chen, Kaufmann & Crum, 2014; Schuler, Puttaiah, Mojtabai & Crum, 2015; Probst, Manthey, Martinez & Rehm, 2015). Lack of (alcohol) problem recognition is cited as the most common reason for not seeking treatment among people with AUD (Probst et al, 2015) and a recent meta-analysis estimated that less than one third of risky drinkers recognise that their drinking is problematic (Smith et al, 2022). People drinking at riskier levels are more likely to perceive a need for help (Oleski et al, 2010; Smith et al, 2022), but early identification of risky drinking is imperative to prevent escalation to more severe alcohol use disorders (i.e., dependence) and the further health risks that they carry.

However, most people with AUD demonstrate “natural recovery”, i.e. they exhibit drinking improvements in the absence of intervention (Tucker, Chandler & Witkiewitz, 2020). This challenges the currently accepted view that AUD is a brain disease (Cunningham & McCambridge, 2012) and highlights the need to identify socio-cognitive and contextual factors that predict remission. Most people with AUD who recover do so without treatment and are able to maintain long-term improvements (Venegas, Donato, Meredith & Ray, 2021). While the process of “maturing out” of drinking is well-established amongst emerging adults (Lee & Sher, 2018), a process of “self-directed change” is often documented amongst adults who report meaningful events and conversations that provoke a desire to change their lifestyle (Subhani et al, 2022; Watson & Sher, 1998). Lower severity drinking is associated with greater chances of recovery without treatment whereas lower reliance on avoidance coping (i.e., using alcohol to avoid stressors) and higher self-efficacy (i.e., perceived ability to achieve goals) can improve the prospects of recovery – regardless of whether formal help is sought (Moos & Moos, 2006; Slidrecht, de Waart, Witkiewitz & Roozen, 2019). A recent review found that an important aspect of natural recovery was “consciously expanding experiences” by engaging in activities such as art, which aided the transition away from a drinker identity (Subhani et al, 2022). For recovery with or without treatment, social support is a key factor in maintaining long-term improvements in drinking and/or abstinence (Bischof, Rumpf, Meyer, Hapke & John, 2007; Slidrecht et al, 2019). Sources of support can include, for example, recovery-oriented networks, family and friends, religious organisations, and other community amenities (Bischof et al, 2007; Brooks et al, 2017; Vigdal, Moltu, Bjornestad & Selseng, 2022). Individuals with AUD who do not seek formal help must therefore rely on resources embedded within their personal networks and local community. Opportunities for re-integrating and participating in the community can help to promote hope and positive social change for both those with AUD and other residents. However, people in recovery from AUD highlight the role of safety and

non-stigmatising attitudes as critical features of their residential environment to support recovery (Best & Lubman, 2012; Vigdal et al, 2022).

Provision of community-based alcohol treatment is primarily the responsibility of local authorities, but involves multi-agency working to support individual needs relating to safe withdrawal with or without medical assistance, psychosocial and behavioural therapies, long-term recovery support, and tackling socioeconomic determinants (e.g., job-seeking, securing accommodation) (PHE, 2018). Evidence suggests that community-based multi-component initiatives and brief intervention can be efficacious in eliciting positive outcomes (PHE, 2018). For community initiatives to be effective, they should focus on early intervention, the development of personal and social skills, and be delivered by trained staff, whereas they should avoid “scare tactics” (PHE, 2018). Recovery communities and local mutual support services can help to promote community participation and thereby facilitate recovery (PHE, 2017).

1.1.2.4. Mutual support and self-help groups

Twelve-step approaches are among the most popular forms of support for AUD. Alcoholics Anonymous (A.A.), for example, is a recovery-oriented mutual-help organisation that aims to support members to achieve and sustain abstinence. The Twelve Steps of A.A. involve admitting a loss of control over alcohol use, putting one’s faith in a Higher Power, seeking to right any wrongs inflicted on others, prayer, and spreading the message of A.A. while actively practicing the principles of A.A. in the long-term (A.A., n.d.). A.A. is not to be confused with “12-step facilitation” or “12-step treatment”, which are evidence-based programmes that have adapted the core aspects of A.A. (i.e., “acceptance” of addiction, “surrender” to a Higher Power, and “active involvement” in 12-step activities; Kelly, Humphreys & Ferri, 2020; National Institute on Drug Abuse, 2011) but are generally delivered in professional contexts. The organisation explicitly states on its website that A.A. “does not engage in the field of alcoholism research, medical or psychiatric treatment, education, or propaganda in any form” (A.A., 2024, p.40), which may explain why some critics view its success as a placebo effect. Sceptics have even described A.A. as a “cult” given that it encourages high levels of social cohesion (defined in Section 1.2.1.) and dependency on the fellowship, but others argue that “the spirituality of A.A. does not compete with medicine” (p. 435, Vaillant, 2005). Nevertheless, the salience of spirituality and religion in 12-step programmes is not always compatible with prospective members’ values and beliefs, which can isolate individuals from recovery-oriented support. Similarly, the emphasis on abstinence can further exclude individuals who want to reduce their

alcohol intake but whose idea of recovery is not predicated on total sobriety (Chambers, Canvin, Baldwin & Sinclair, 2017).

Individuals seeking alcohol-related support may also access secular recovery groups such as SMART Recovery, which is an acronym for Self Management and Recovery Training. This peer-guided programme supports the management of health-harming behaviours (e.g. alcohol use) through motivational techniques and CBT principles. Unlike A.A. and other 12-step approaches, SMART Recovery does not endorse the use of pejorative labels such as “alcoholic” and “addict”, and instead aims to equip group members with psychosocial tools that support personal choices to manage alcohol-related problems as well as broader life stresses that can hinder recovery (UK SMART Recovery, n.d.). A longitudinal study found that the efficacy of secular recovery groups is comparable to that of 12-step groups, although there was some evidence that individuals with lower motivation for abstinence self-select into secular groups as opposed to spiritual groups (Zemore, Lui, Mericle, Hemberg & Kaskutas, 2018). A recent review further suggests that A.A. and other 12-step and facilitation programmes are generally comparable, and in some cases superior, to other clinical interventions for AUD (e.g. motivational enhancement therapy, CBT) with regards to effectiveness in improving abstinence rates, reducing drinking intensity, and lessening alcohol-related consequences (Kelly et al, 2020). The review also supported the cost-effectiveness of A.A. and 12-step facilitation as they were associated with higher savings than outpatient treatment, no treatment, and other interventions (Kelly et al, 2020). Evidence suggests that A.A. might lead to drinking reductions (i.e., more days abstinent and fewer drinks per drinking day) through improved social self-efficacy for abstinence and greater social support for abstinence (Kelly, Hoepfner, Stout & Pagano, 2012). These findings highlight potential social mechanisms of change that are instrumental in recovery from AUD and might be triggered by engagement in peer support groups (Humphreys, Mankowski, Moos & Finney, 1999; Kelly, Magill & Stout, 2009; Kelly et al, 2012; Tracy & Wallace, 2016). Mutual-support groups like A.A. embody forms of social capital (see Section 1.2.2. for a conceptual overview), which is theorised to play a pertinent role in recovery (Granfield & Cloud, 2001; Putnam, 1995).

1.1.3. Mental health and stress

“Psychological distress” is an umbrella term for emotionally adverse experiences that involve symptoms of depression, anxiety, and stress. It does not refer to any specific mental disorder nor constitute a clinical diagnosis, and it refers to mild mental health disturbances as well as more severe experiences of mental illness. The term “common mental disorder” (CMD)

describes prevalent psychological conditions such as depression, generalised anxiety disorder (GAD), obsessive compulsive disorder (OCD), and post-traumatic stress disorder (PTSD). This does not include conditions such as schizophrenia and bipolar disorder, which instead constitute “severe mental illness” (SMI) – a term used to describe less common psychological disorders that severely impair psychosocial functioning. A large meta-analysis covering 63 countries found that one in five people (aged 16-65) globally experienced a past-year CMD while approximately 30% had a CMD at some point in their lifetime (Steel et al, 2014). The prevalence of CMD was higher in English-speaking countries compared to countries in which the dominant language is not English (Steel et al, 2014). In England, an estimated one in six adults experience a CMD in any given week (McManus et al, 2016), with GAD (5.9%) and depressive episodes (3.3%) being the most frequently reported disorders alongside unspecified CMD (7.8%) (Baker, 2020). Psychological distress can be internalised (i.e., inwardly experiencing distress, such as through social withdrawal and negative affective states) and/or externalised (i.e., outwardly experiencing distress, such as through antisocial behaviour and substance use) (Krueger, 1999). There are relatively strong correlations between externalising symptoms and drinking problems, while associations between internalising symptoms and drinking problems are weaker yet significant (Saraceno et al, 2009).

It is well established that risky alcohol use and alcohol use disorder (AUD) are highly comorbid with mental health problems (Di Florio, Craddock & van den Bree, 2014; Kessler, Chiu, Demler, Merikangas & Walters, 2005; Lai, Cleary, Sitharthan & Hunt, 2015; Reiger et al 1990; Yang et al, 2018) – to such an extent that some academics argue comorbidity is “the rule rather than the exception” (Cridland, Deane, Hsu & Kelly, 2012). However, the prevalence of CMD within cases of AUD tends to be higher than the prevalence of AUD within cases of CMD. A recent meta-analysis found that people with a CMD are twice as likely to have experienced an AUD than people without a CMD, with 17% of people with an anxiety or phobic disorder and 11% of people with a mood disorder having AUD (Puddephatt, Irizar, Jones, Gage & Goodwin, 2022). In England, it is estimated that 64% of individuals engaged with alcohol treatment services also report a need for mental health treatment (Office for Health Improvement & Disparities, 2021). Furthermore, comorbid mental health problems and symptoms are predictive of relapse to drinking (Bradizza, Stasiewicz & Paas, 2006; Sliedrecht et al, 2019). With regards to non-pathological drinking outcomes, people with a CMD are more likely to engage in binge drinking than those without a CMD but associations between CMD and drinking alcohol at all are mixed (Puddephatt et al, 2022).

Populations with co-occurring severe mental health problems and alcohol/drug use (COSMHAD) are heterogeneous, and that there is variation in the temporal sequencing of disorder onset (Garey et al, 2020; Simpson & Tucker, 2002). There is substantial evidence for a bidirectional relationship between alcohol use and psychological distress/disorder, whereby alcohol use leads to mental disorder via disruption of biological and physiological pathways and mental disorder leads to alcohol use, often as a coping strategy (Garey et al, 2020). Alternatively, the shared-vulnerability hypothesis posits that shared combinations of genetic, environmental and lifestyle risk factors predispose individuals to both CMD and alcohol use problems (Garey et al, 2020). Stress is a known risk factor for psychological distress and mental disorder (Keyes, Hatzenbuehler & Hasin, 2011; Keyes, Hatzenbuehler, Grant & Hasin, 2012). In brief, perception of threat in response to a stressor leads to hyperactivation of the hypothalamic-pituitary-adrenal (HPA) axis and the release of cortisol (a stress hormone), which can interact with the mesolimbic dopaminergic pathway (i.e., the brain's reward pathway) to reinforce alcohol use (Stephens & Wand, 2012). Appraisal of one's ability to cope with the stressor determines whether the stress response is positive (i.e., "eustress") or negative (i.e., distress) (Lazarus & Folkman, 1984). Chronic exposure to stress can cause dysfunction of the HPA axis, which is associated with the onset and maintenance of mental disorder and is implicated in alcohol problems (Esch, Stefano, Fricchione & Benson, 2002; Kreek & Koob, 1998; Stephens & Wand, 2012). Chronic heavy drinking can also contribute to the dysregulation of the stress response system due to neuroadaptations, which can increase the risk of relapse (Yang et al, 2018). Higher levels of consumption and risk of AUD are associated with a range of stressors, including childhood maltreatment, catastrophic events, minority stress, and stressful life events like divorce and job loss (Keyes et al, 2011; Keyes et al, 2012). The bidirectional relationship between alcohol problems and mental health conditions (Conner, Pinquart & Gamble, 2009; Pacek, Martins & Crum, 2013) has received significant attention, and there is evidence that mental disorder often precedes AUD (Conner et al, 2009; Pacek et al, 2013; Swendsen et al, 2010). In longitudinal models of the relationship between alcohol use and mental health, psychological distress typically precedes increased alcohol consumption in lower-level drinkers and is a barrier to drinking reductions in those who already drink at higher levels (Bell & Britton, 2014; Treur, Munafò, Logtenberg, Wiers & Verwei, 2021). On the other hand, individuals with better mental health but heavier alcohol intake tend to reduce their consumption over time, while self-reporting relatively stable mental health (Bell & Britton, 2014).

Treatment for mental health conditions and comorbid alcohol use problems

Research suggests the benefits of social interventions to treat CMD may exceed those of medical treatments alone (Almedom & Glandon, 2008). However, social interventions have also been reported to have no effect on mental health outcomes (Webber et al, 2021), although it is important to note that limited community resources and biases towards biomedical approaches can be detrimental to the implementation of social interventions. The NHS Five Year Forward View for Mental Health proposes strategies to better integrate mental and physical healthcare, improve access to healthcare, address comorbidities and reduce health inequalities (NHS England, 2016; The Mental Health Taskforce, 2016). This includes plans to provide 24/7 crisis response, addressing unmet physical health needs of those with mental health conditions and continue incentivising shifts towards healthier lifestyles (e.g. smoking cessation), supporting employment through improved access to psychological therapies, tackling stigma, and supporting partnerships between healthcare, local authorities and government organisations to ensure adequate community-based support.

Despite the high co-occurrence of (and increased risks associated with) alcohol and mental health problems, individuals with COSMHAD seldom receive treatment for both issues and face unique barriers to treatment (Carrà, Bartoli, Brambilla, Crocamo, & Clerici, 2015). For example, alcohol problems can intensify mental disorder symptoms, which can hinder treatment-seeking and service access, while under-diagnosis of both of the disorders can be detrimental to treatment outcomes (Priester et al, 2016). Urgent calls for better integration of mental health and substance use services in order to address COSMHAD have been largely ignored in practice and policy (Alsuhaibani, Smith, Lowrie, Alijhani & Paudyal, 2021). A recent review found that most clinical guidelines fail to mention the prospect of integrated treatment, lack consideration of possible drug interactions that may occur between medications used to treat mental disorder and addiction (as well as the substance of abuse), and ignore social determinants of health (Alsuhaibani et al, 2021). Although there have been calls for a multimorbidity paradigm, further work is needed to implement such an approach as there is a lack of clarity regarding how to approach triaging, service-user preferences, and choosing the most efficacious treatment (Bhalla & Rosenheck, 2018). Public Health England (2017) supports the NHS Five Year Forward plans and encourages treatment providers to have an “open door policy” that prevents exclusion of people with COSMHAD from either mental health or substance use services. A recent realist synthesis of COSMHAD service models emphasises the importance of committed leadership, managing workforce expectations of COSMHAD services, and clear service delivery processes, for improving care co-ordination and care engagement from individuals with COSMHAD (Harris et al, 2023). Addressing these contextual factors involves, for example, collaborative working and partnerships, tackling attitudinal barriers to compassionate care, incorporating biopsychosocial perspectives (see

Section 1.1.4.) early into professional training, and providing mental health-led services that can be tailored to simultaneously address comorbid substance use issues (Harris et al, 2023).

1.1.4. Theories of alcohol use

Biological, psychological, and social theories of alcohol use

Modern theories relevant to alcohol use typically focus on biological, psychological or social explanations of drinking behaviours, or a combination of these perspectives. Biological theories of alcohol use typically focus on genetic explanations for AUD, the role of neurotransmitters in the development of AUD, and abnormalities in brain structure and/or functioning. Research has demonstrated that chronic heavy drinking leads to structural and functional changes in the brain, such as reduced grey and white matter volume (which are critical for information processing and brain connectivity, respectively), and dysregulation of stress and reward systems (Geibprasert, Gallucci & Krings, 2010; Tunstall, Carmack, Koob & Vendruscolo, 2017). There is also robust evidence that individuals may be genetically predisposed to alcohol problems (Tawa, Hall & Lohoff, 2016), with meta-analytic findings from twin and adoption studies indicating that the heritability of AUD is approximately 50% (Verhulst, Neale & Kendler, 2015). This is supported by research demonstrating the intergenerational transmission of alcohol problems (Campbell & Oei, 2010). However, gene-environment interactions may also impact the heritability of AUD (Tawa et al, 2016).

Pleasurable effects of drinking are experienced because alcohol crosses the blood-brain barrier and causes dopamine to be released in the mesolimbic pathway – also referred to as the brain’s reward system. This incentivises subsequent drinking. Persistent heavy use can lead to gradual sensitisation of the dopaminergic system and subsequent alcohol cravings (Robinson & Berridge, 1993). Incentive sensitisation theory posits that cravings arise due to heightened incentive salience (i.e., “wanting”) attributed to alcohol and related stimuli. This increased “wanting” triggers alcohol-seeking behaviours but does not concur with increased “liking” (of alcohol). Thus, the pleasurable effects of alcohol may diminish and tolerance increases, so greater amounts are required to experience the same level of intoxication. Even minor exposure to alcohol or related-stimuli may prompt compulsive drinking and bingeing when incentive sensitisation processes are severely dysregulated. Whether people with severe AUD should therefore endeavour to be abstinent (rather than return to controlled drinking) after safe detoxification and treatment remains controversial (Davis & Rosenberg, 2013; Mann, Aubin & Witkiewitz, 2017).

Biological explanations have been criticised for being reductionist because they ignore important contextual and cognitive determinants and outcomes of drinking (Field, Heather & Wiers, 2019). Despite this, proponents of the brain disease model have acknowledged psychosocial risk factors that can influence the development of AUD such as exposure to “socially stressful environments with poor familial and social supports” (p.367, Volkow et al, 2016). The biopsychosocial model is currently widely accepted as the dominant approach to understanding alcohol use, as exemplified by the NIAAA (2024) and American Psychological Association (2018). A biopsychosocial model of alcohol use and related problems recognises biological, psychological and social explanations, while also accounting for interactions between these factors (Griffiths, 2005). Reviews suggest that a combination of genetic and environmental factors contribute to the manifestation of both mental health and alcohol use problems (Yang et al, 2018), but also highlight that study design and sampling can result in inflated prevalence estimates of comorbidity (Lai et al, 2015; Raimo & Schuckit, 1999).

Psychosocial theories emphasise how cognition and affect predict alcohol use. Social cognitive theory suggests that individuals learn drinking behaviours from their social environment and develop “outcome expectancies” that guide their future interactions with alcohol (Bandura, 2001). Outcome expectancies are beliefs about the consequences of one’s actions, and they may be positive or negative. Empirical research supports a link between outcome expectancies and alcohol consumption, which may be mediated by drinking motives (Hasking, Lyvers & Carpio, 2011). Social cognitive theory also emphasises the role of self-efficacy in determining alcohol consumption (Bandura, 2001), for example, in resisting alcohol, coping with stress without using alcohol, and initiating behavioural change (e.g. drinking reductions). Theoretically, positive outcome expectancies (i.e., anticipating that drinking will lead to good consequences, such as boosting confidence) are associated with increased alcohol intake whereas negative outcome expectancies (i.e., anticipating bad consequences, such as being hungover) are inversely associated with alcohol use (Jones, Corbin & Fromme, 2001). Outcome expectancies are largely dependent on previous drinking experiences, and they may be implicit (i.e., operating without one’s full awareness) or explicit (i.e., self-reported beliefs or intentional recall of previous experiences). Hence, social cognitive theory recognises both inter- and intrapersonal factors that impact drinking behaviours. The theory of planned behaviour (Ajzen, 1985) similarly suggests that alcohol use patterns are governed by behavioural, normative and control beliefs. Perceived control over – and attitudes towards – alcohol, in tandem with perceived drinking norms, determine one’s intention to drink, which in turn determines whether and to what extent alcohol is consumed.

Drinking expectancies are also central to motivational models of alcohol consumption (Cox & Klinger, 1988; Young, Oei & Knight, 1990), which inherently recognise the pharmacological and neurobiological effects of alcohol on the brain (e.g., dopaminergic system). From this perspective, alcohol is consumed for the purpose of affect regulation, i.e. to increase positive emotion or relieve negative emotion. Theory suggests a four-factor model of drinking motives, which can be categorised as: “social motives”, “conformity motives”, “enhancement motives”, and “coping motives” (Cooper, 1994). Social motives include drinking to ease social situations or gain social rewards (e.g. status, sexual success), whereas conformity motives include drinking for social approval or to avoid rejection. These two motive types are conceptualised as external motives because alcohol consumption is driven primarily by contextual factors rather than internal factors (e.g. mood) within the individual. Enhancement motives refer to drinking to boost positive emotions and/or feel intoxicated while coping motives refer to drinking to alleviate negative emotional states or forget about personal problems. These two motive types comprise internal drinking motives. Drinking motives have been found to predict alcohol use outcomes, whereby internal motives more strongly predict drinking problems (Bresin & Mekawi, 2020).

Coping motives are a key tenet of the self-medication (Bolton, Robinson & Sareen, 2009; Khantzian, 1990; Khantzian, 1997; Khantzian, 2003) and tension-reduction (Conger, 1956) hypotheses, which focus on alcohol consumption as a means of reducing unpleasant feelings, such as psychological distress, low mood, tension and stress. In support of these theories, there is evidence linking stress and negative affect with increased alcohol consumption (Keyes et al, 2011; Keyes et al, 2012; Sinha et al, 2009), with research showing that self-medication with alcohol is associated with a greater likelihood of developing AUD (Turner, Mota, Bolton & Sareen, 2018). Drinking to cope is also more likely in people who drink alone, which itself is associated with problem drinking (Skrzysnki & Creswell, 2020; Skrzysnki & Creswell, 2021). Associations between alcohol use and distress are complex and bidirectional so there remains uncertainties about the temporal sequencing and causality of mental disturbances and drinking problems, particularly because self-medication is not only confined to clinical populations (Turner et al, 2018). The self-medication hypothesis argues that “there is a considerable degree of psychopharmacologic specificity in an individual’s preferred drug” (p. 47, Khantzian, 2003), such that the depressant effects of alcohol on the central nervous system are especially suited to relieving heightened states of arousal and feelings of isolation. Empirical quantitative research has generally failed to support this contention regarding specificity (Darke, 2013; Lembke, 2012) and recent research suggests that *positive* (but not negative) affect is associated with a higher likelihood and intensity of drinking (Dora et al, 2023; Tovmasyan, Monk, Sawicka & Heim, 2022). Nevertheless, qualitative accounts from

people with AUD explicitly express drinking to numb physical and emotional pain, help get to sleep, and cope with stress (Haighton et al, 2018), which suggests that these sedative effects are specifically related to the addictive potential of alcohol.

Acceptance of the biomedical model detracted blame for alcohol use problems away from individuals and instead perpetuated an understanding that AUD is a “disease” that requires treatment rather than a moral failing, for which affected people should be shunned (Heilig et al, 2021; Volkow et al, 2016). This paradigm shift provided an impetus for increased alcohol treatment service provision and helped to combat stigma (of “immorality” and “weak will”) by reframing the issue of choice in public and professional understandings AUD aetiology and development (Heilig et al, 2021; Volkow et al, 2016). However, the biomedical model did not fully absolve AUD of stigma since it is possible that “decreased attributions of free will infantilize individuals with an addiction and portrays them as dangerous” (p.2, Racine, Sattler & Escande, 2017). The biomedical model is a topic of controversy due to the diminished role of personal agency in resolving AUD and failure to recognise contextual factors that influence the development of AUD (Field et al, 2019; Racine et al, 2017). Biopsychosocial models of alcohol use provide more holistic accounts of drinking behaviours than biomedical models by taking a multidisciplinary perspective that can also explain interdependencies between the “bio-“, “psycho-“, and “social” factors. However, it is difficult to test biopsychosocial models given this additional complexity, and the extent to which “bio-“, “psycho-” or “social” factors should be prioritised is unclear.

One limitation of the biopsychosocial approach is that it does not distinguish between different levels of socio-ecological influence, such that individuals can be impacted by active participation in social interactions or passively impacted by features of their environment and wider systems that govern society as a whole (e.g. institutions and legislative powers). This oversight of the biopsychosocial model impedes effective and equitable policy development since contextual factors operating beyond an individual’s control (or awareness) are largely ignored as priorities for intervention. A socioecological approach to understanding alcohol involvement often draws attention to proximal and distal environmental features that constitute sources of acute and chronic stress, which have been theorised to influence drinking via some of the mechanisms already outlined in this section (e.g. social learning, tension-reduction). Revived interest in socio-ecological determinants of health risk behaviours in recent years may reflect a paradigm shift towards what some scholars refer to as a “eco-biopsychosocial” or “biopsycho-ecological” framework for understanding drinking behaviours (Chen et al, 2022; Stineman & Streim, 2010). Socioecological models of health, in relation to alcohol use, are described in Section 1.1.6.

1.1.5. Sociodemographic, socioeconomic, and geographic correlates of alcohol use and mental health problems

Research highlights socioeconomic, demographic and geographical patterns of alcohol use and mental health (Skogen et al, 2019; WHO, 2018). There is consistent evidence that females have higher rates of psychological distress (than males) that typically manifest as mood disorders and anxiety (Bamford, Klabbers, Curran, Rosato & Leavey, 2021; McLean, Asnaani, Litz & Hofmann, 2011; McManus et al, 2016; Steel et al, 2014; Steptoe & Feldman, 2001). Males on the other hand are more likely than females to have substance use disorders (Jane-Llopis & Matytsina, 2006; McManus et al, 2016; Steel et al, 2014), which in part reflects gendered differences in “externalising” and “internalising” behaviours (Dawson, Goldstein, Moss, Li & Grant, 2010; Krueger, 1999). There is strong evidence that, compared to females, males are more likely to be current drinkers, to engage in risky drinking behaviours (e.g. binge drinking, heavy drinking), to drink alone, and to develop AUD (Erol & Karpyak, 2015; McManus et al, 2016). A decline in risky alcohol use has been observed for men in England since 2000 while women’s drinking has shown little change (McManus et al, 2016). Risky alcohol consumption is much less prevalent in both males and females aged over 64, however hazardous drinking among women typically peaks between the ages 16-24 and declines over the life course while hazardous use among men remains relatively high throughout the ages 16-64 (McManus et al, 2016). Longitudinal research further suggests that drinking trajectories function in relation to gender dynamics (Cambron et al, 2017). For example, females typically have lower baseline alcohol problems and reduce drinking from risky levels more rapidly than males (Cambron et al, 2017). In England, population alcohol consumption has steadily declined since 1998 which is mainly explained by reductions in men’s drinking and no clear pattern of change among women (NHS Digital, 2020a). Young people are reporting increasing levels of non-drinking, whereby individuals aged 16-24 have the highest rates of non-drinking compared to all other age groups, yet they are also the most likely to binge drink (ONS, 2018). Higher levels of psychological distress are more prevalent in individuals who are unemployed, have low monthly income, and have low educational attainment (Bamford et al, 2021; Helbich, Hagenauer & Roberts, 2020), demonstrating that low socioeconomic status is potential a risk factor for CMD. Despite the strong associations between mental health and alcohol use, higher rates of hazardous drinking and more severe alcohol misuse are seen in higher-SES individuals, though there is evidence of a non-linear, U-shaped relationship between SES and alcohol outcomes (Beard et al, 2016). This possibly reflects the greater purchasing power of people who have a higher SES.

Mental health problems are also associated with higher rates of non-drinking, and recent evidence suggests that this is not explained by socioeconomic factors (Puddephatt et al, 2021). However, there are major mental health disparities in the UK, whereby higher area deprivation is associated with elevated rates of mental disorder and worse treatment outcomes (Baker, 2020). The South West (21%) and North West (19%) of England have the highest rates of CMD in England whereas the prevalence of CMD is lowest in the East and South East of England (both 14%) (Baker, 2020).

1.1.6. Socio-ecological models of alcohol use

Socio-ecological models are widely used in public health research to map the proximal, distal and interactive influences on behaviour (Richard, Gauvin & Raine, 2011). The appeal of socio-ecological models as heuristic tools to inform research and practice has led to diverse applications across the social sciences, healthcare, and criminology, among other disciplines, to better understand drivers of mental health and health (risk) behaviours (Maruthaveeran & van den Bosch, 2014; Richard et al, 2011). Bronfenbrenner's seminal works on Ecological Systems Theory (Bronfenbrenner, 1979; Bronfenbrenner, 1986), and the more recent Bioecological theory (Bronfenbrenner & Morris, 2007), provided a framework for understanding health and development – with the micro-, meso-, exo- and macro- systems (further incorporating the chrono-system in later works) representing increasingly distal determinants, “like a set of Russian dolls” (Bronfenbrenner, 1979, p. 3). Individual-level influences have been studied extensively and typically include factors such as genetic influences, socio-demographic profiles, personality, psychopathology, and intrapsychic processes (Turner, Mermelstein & Flay, 2006). In socioecological models, the micro-system refers to an individual's immediate environment, which is generally their household members and close peers. The meso- and exo- systems constitute medial influences, wherein the individual may actively engage with aspects of multiple micro-systems (e.g. work and home) or passively experience their wider environments. The macro-system is often depicted as the outermost layer – representing distal influences over a person's behaviour that are linked to socio-cultural norms and values.

There is currently a lack of consensus regarding the level at which neighbourhoods are situated, with some studies conceptualising neighbourhoods as part of the microsystem (Ashiabi & O'Neal, 2015) or exosystem (Kilanowski, 2017), and with others focusing on community connections as the mesosystem (Halsall et al, 2023). Individual and (family/peer)

network factors remain at the forefront of investigations into social drivers of alcohol use, often with little or no consideration of wider neighbourhood and societal factors. Empirical research framed within socioecological theory contends that, although these wider factors play a weaker role in individual drinking behaviour than more immediate factors, the effects they exert independently and interactively have an important place in the literature (Brenner, Bauermeister & Zimmerman, 2011; Compton et al, 2019).

The rationale for applying socio-ecological models in the context of alcohol use is that changes occurring in distal environments (i.e., macro-system, meso-system), such as implementation of new policies or emergence/loss of alcohol outlets, can elicit multiplicative effects on individual- and network-level drinking behaviours (Gruenewald, Remer & LaScala, 2014). Those who experience increased risk often have intersecting identities that give rise to amplified experiences of marginalisation conducive to poor health and risk behaviours (Alvidrez, Greenwood, Johnson & Parker, 2021). Analyses conducted within socio-ecological frameworks demonstrate that contextual factors such as the types and density of alcohol outlets are important predictors of individual alcohol consumption, and that these macro-level effects may operate differently depending on individual drinker characteristics (Gruenewald et al, 2014; Karriker-Jaffe, Witbrodt, Mericle, Polcin and Kaskutas, 2020). For example, Gruenewald et al (2014) found clear ethnic differences in drinking practices, with white participants being more likely to drink in on-license premises, black participants being more likely to drink at home, and Hispanics being more likely to drink in party settings or in the homes of friends and relatives. There is also a spatial component to gendered drinking patterns, whereby one US study found that home-drinking was more common amongst men while women were more likely to drink in other contexts (Gruenewald et al, 2014). However, this contrasts with UK research that shows women are more likely to drink at home whereas men more often drink in pubs (Brierley-Jones et al, 2014).

Conflicting findings such as these point to international differences in drinking practices (Bond et al, 2010) that may also be better understood with the use of multilevel models and socio-ecological frameworks. Karriker-Jaffe et al (2020) tested a socio-ecological model of alcohol relapse and recovery from problem drinking, using longitudinal data based on a treatment-engaged sample in California, US. The three-level model posits neighbourhood factors influencing recovery to include availability and types of treatment, alcohol licensing and outlet density, and neighbourhood socio-economic compositional factors. Medial (network) factors, situated between the neighbourhood and individual levels, encompass the proportion of substance users versus sober individuals in a social network, supportive climate for abstinence and pressures towards drinking cessation, and engagement with self-help

resources/groups. In accordance with prior theory and research, individual factors include demographic characteristics, histories of substance use and treatment, and psychological problems. Neighbourhood (i.e., poverty and outlet density), network, and individual risk factors each have long-lasting effects on trajectories of alcohol dependence symptoms following treatment. Based on the population from which this sample was drawn, increasing proportions of heavy drinkers within individuals' social networks were associated with a higher likelihood of problem drinking, and this effect (of heavy drinking contacts) was strengthened as neighbourhood disadvantage increased (Mericle, Kaskutas, Polcin & Karriker-Jaffe, 2018).

1.1.7. Alcohol from a public health perspective: Upstream and downstream approaches to addressing alcohol harms

From a public health perspective, management of alcohol (mis)use problems on a population scale requires collaboration between multiple agencies that combines upstream and downstream approaches to prevention and treatment (McMahon, 2022; WHO, 2023). Upstream approaches aim to address the “causes of causes” by tackling macro-level socio-structural barriers to health, often via policy. These strategies are implemented at the societal level and include restrictions on alcohol availability, regulations on advertising, licensing legislation, and fiscal measures such as alcohol taxation. Downstream approaches focus more on meeting individual needs through ensuring clinical care and interventions are provided where necessary – for example, emergency department visits, pharmacological treatments, and provision of behavioural interventions. In this sense, downstream strategies are typically used to *treat* (or reduce harm from) chronic illness that has already been acquired, whereas upstream strategies are devised to *prevent* harm from occurring (e.g. preventing the onset of AUD in risky drinkers).

Although a combination of upstream and downstream provides a more holistic approach to confronting alcohol harms than any one of these alone, the examples listed here represent the dominance of the “deficits-based” angle from which most health-improvement efforts are applied (Morgan & Ziglio, 2007). “Deficits-based” approaches focus solely on what is ‘wrong’ with individuals or communities and what they lack. They require external input from institutions that is disseminated from the top-down and often lack long-term sustainability (Harrison, Blickem, Lamb, Kirk & Vassilev, 2019; Nurture Development, 2018). To further improve current agendas for health improvement and reducing inequalities, research suggests that a strengths-based approach implemented at varying socioecological levels may have

promise (Harrison et al, 2019; Kretzmann & McKnight, 1993). Section 1.2.4. outlines some of these approaches to community development.

Alcohol policy

Alcohol control policies aim to prevent and reduce alcohol-related harms by implementing and monitoring initiatives at scale – from local to national, and up to the global level. The WHO (2017) provides a list of “best buys”, among other recommended interventions, that comprise the top cost-effective and feasible policy options to tackle global alcohol harms. These “best buys” include higher excise taxes on alcohol sales, restricting alcohol marketing, and reducing alcohol availability (both licit and illicit), in addition to improving access to SBIRT (see Section 1.1.2.1.) and enforcing measures to prevent drink-driving. A comprehensive technical package to guide WHO Member States with the delivery of global agendas to tackle alcohol harms at national and subnational levels was launched in 2018 (WHO, 2019b). This initiative, called “SAFER”, reiterates the value of the “best buys” and supports the overall goal of a 10% decrease in harmful alcohol use by 2025, which was set to support the non-communicable diseases Global Monitoring Framework at the 2013 World Health Assembly (WHO, 2017; WHO, 2019b). By 2019, there was some progress aligned with the SAFER initiative, particularly with regards to pricing policies, but implementation of pricing policies as well as community-based initiatives and strategies to improve health service responses and reduce negative alcohol-related consequences remained low (WHO, 2021). More recently, the Global Alcohol Action Plan (WHO, 2024) was adopted at the 75th World Health Assembly in 2022, which exceeds the SAFER target and instead aims to achieve a 20% reduction in harmful alcohol use by 2030 (compared to in 2010) in line with the United Nations’ Sustainable Development Goals – a set of 17 goals to tackle global socioeconomic, environmental and health-related issues by 2030 (United Nations, 2015). The Global Alcohol Action Plan also specifies that at least 70% of Member States should have begun implementing strategies endorsed as “best buys” by 2030 (WHO, 2024), however evidence-based policy changes face opposition from the alcohol industry, which is recognised as a barrier to the implementation of initiatives supporting the Global Alcohol Action Plan (McCambridge & Lesch, 2024). It is not anticipated that the global goals of reducing harmful alcohol use will be met (Manthey et al, 2019). The Global Burden of Disease studies indicate a global increase in age-standardised summary exposure values (a metric indicative of prevalence and risk) related to high alcohol use from 6.99 in 2019 to 12.60 in 2021 (Brauer et al, 2024; Murray et al, 2020).

Research supports raising alcohol prices as an effective strategy to reduce population alcohol consumption and related harms (Burton et al, 2017). Minimum unit pricing (MUP) is one strategy that was implemented in Scotland during May 2018 (Woodhouse, 2020). This policy imposed a minimum cost of 50p per unit of alcohol in a bid to tackle harmful drinking (e.g. binge drinking) while having relatively little impact on those who drink at moderate levels. Although alcohol sales below cost price (i.e., alcohol duty plus VAT) are prohibited in England, MUP has not been implemented despite many third sector organisations, researchers and politicians advocating in its favour (Woodhouse et al, 2020). Models based on a hypothetical MUP of 40-50p estimate its effect (on reducing alcohol consumption) to be 40-50 times greater than that of the ban on below cost sales (Brennan, Meng, Holmes, Hill-McManus & Meier, 2014; Burton et al, 2017). It is anticipated that MUP would primarily affect heavier drinkers and not punish moderate drinkers (Holmes et al, 2014), but there is concern from the public regarding the effectiveness of MUP, restrictions on people's personal freedom to drink, and the potential to penalise drinkers who are socioeconomically disadvantaged (Lonsdale, Hardcastle & Hagger, 2012). However, recent evidence demonstrates that MUP in Scotland was associated with significant decreases in alcohol-attributable deaths and hospitalisations, while the greatest improvements were observed in the most socioeconomically disadvantaged areas (Wyper et al, 2023).

Alcohol advertising regulations are similarly well-supported as being highly (cost-)effective with regards to preventing alcohol harms, but poor self-regulation by the alcohol industry is a barrier to improving public health (Burton et al, 2017). One reason for this lies in the industry's propensity to shift accountability for alcohol harms to individual drinkers – thus claiming that interventions should be aimed primarily at higher-risk drinkers rather than the entire drinker population (Hawkins, Holden & McCambridge, 2012). Academic literature contradicts this and highlights the benefits of regulating alcohol advertisement content in relation to hazardous drinking (Bosque-Prous et al, 2014), as well as tackling children's exposure to alcohol marketing (Aiken et al, 2018). In the UK, the Advertising Standards Authority (ASA), among other governing bodies such as Ofcom, oversees alcohol marketing regulations that are established by the Committee of Advertising Practice (CAP). The ASA and CAP prohibit the inclusion of individuals aged under 25 in alcohol adverts, broadcasting alcohol adverts via media that is aimed at (or especially appealing to) underage populations (aged <18), and marketing content that depicts irresponsible drinking or associates alcohol consumption with psychosocial benefits (CAP, 2014). For example, adverts must not suggest that alcohol can improve mood, confidence or sexual success, and they must not portray alcohol use as a challenge or link its consumption with machismo.

The impact of reducing alcohol availability on reducing alcohol harms has received relatively less empirical support compared to the other two “best buys” outlined above. There is mixed evidence regarding the link between alcohol outlet density and alcohol consumption (Gmel, Holmes & Studer, 2016), although this may be partially attributed to variation in study designs and differences in the spatial units assessed (see Section 2.9. for a summary of methodological issues in studies of area effects). Although residents of higher SES areas are more likely to be heavy drinkers than residents of low SES areas, multiple studies conducted in high-income countries show that alcohol outlet density is highest within the most disadvantaged areas (Hay, Whigham, Kypri & Langley, 2009; Pollack, Cubbin, Ahn & Winkleby, 2005). Studies suggest that a higher density of off-premise alcohol outlets are detrimental to social capital formation (Theall et al, 2009; see Section 1.2.2. for a conceptual overview of social capital). Supporting this, a loss of alcohol outlets during the US civil unrest period in the 1990s was reportedly followed by increased “vertical” social capital (i.e., voting) (Scribner et al, 2007). Measures to restrict alcohol availability often centre around preventing underage drinking and typically include having a legal drinking age, requiring valid ID to purchase alcohol if someone looks younger than 25 (i.e., “Challenge 25” policy), and enforcing laws that prohibit the sale of alcohol to somebody who is buying alcohol on behalf of an underage person.

Policies focusing on health education aim to facilitate informed decisions about drinking and raise awareness of the associated risks (Wilkinson, 2013). This may involve delivering sessions in schools to delay onset of drinking and prevent risky drinking at a young age; mass media campaigns that inform the public about drinking harms or alter attitudes towards alcohol; social media trends such as “Dry January” and the “sober curious movement”, which encourage abstinence as a collective challenge (de Visser, Robinson & Bond, 2016; Lunnay et al, 2022); and mandating the display of units and/or health warnings on alcoholic beverages to enable self-monitoring of one’s intake. Other policy areas relate to the implementation of screening and brief intervention in various settings, enforcing drink-driving laws, and enacting legislative changes that restrict where and when consumers are allowed to drink alcohol (Burton et al, 2017).

Despite general acceptance and awareness of alcohol policies, a study of almost 1,000 UK drinkers found that only 8% could recall the Chief Medical Officers’ recommended drinking limits (Rosenberg et al, 2018). Recognising the causal link between alcohol consumption and cancer is associated with a higher likelihood of knowing the recommended drinking guidelines (Rosenberg et al, 2018) and greater support for alcohol control policies (Buykx et al, 2015).

1.1.8. Neighbourhood environments as determinants of health and health-related behaviours: Conceptualisation, theorised processes, and rationale for further work

The terms “neighbourhood” and “community” refer to socio-spatial phenomena and are often used interchangeably in reference to populations that share a portion of geographic space, a sense of unity, sociodemographic characteristics, norms and values, social relationships, administrative boundaries within which government programmes and policies can be implemented, landmarks and facilities, and/or engage in similar activities (Baffoe, 2019; Hillery, 1955; Jenks & Dempsey, 2007; MacQueen et al, 2001). Sociologists recognise that concepts of “neighbourhood” and “community” largely overlap but contend that they represent separate constructs. However, there is no universal definition for either concept. Hillery’s (1955) semantic exploration of “community” revealed 94 unique definitions that converged only in the notion that the concept involves people. A recent paper reviewing the meaning of “neighbourhood” categorised its conceptualisations into three approaches: neighbourhoods as places, communities, and policy units (Baffoe, 2019). These approaches respectively emphasise that neighbourhoods can be defined by physical space and residential configuration (e.g. gated premises, council estates), subjectively-defined boundaries, and the functional basis for governments to allocate resources (Baffoe, 2019). Physical space and boundaries are more salient in definitions of “neighbourhood”, whereas “communities” may transcend geographic units (Jenks & Dempsey, 2007), such as in the case of spiritual or religious groups. Despite this, consideration of social dynamics and cognitive appraisals of group membership also remain critical to understanding neighbourhoods and their role as health determinants.

The Whitehall studies (Marmot et al, 1978; Marmot et al, 1991; Marmot et al, 2013; Stafford, Gimeno & Marmot, 2008) investigated health inequalities in a sample of civil servants and drew attention to the social gradient of health in Britain. Staff of higher occupational grades had lower mortality rates than those of lower-grade staff. These studies demonstrated the adverse effects of chronic stress and deprivation on health, and shed light on the role of health behaviours (e.g. alcohol use, smoking, physical activity), which were also found to occur across a social gradient. Respondents of lower occupational grades also had less and lower-quality social support than their higher-grade counterparts, which reaffirms the need for greater recognition and understanding of social determinants in public health research. A recent RAND report introduced the concept of community allostatic load (Chandra, Cahill,

Yeung & Ross, 2018) – an extension of individual allostatic load, which refers to the physiological burden of cumulative stress and is implicated in a range of adverse mental and physical health outcomes (McEwen, 1998). Community allostatic load integrates related concepts such as individual allostatic load, community resiliency (a community's ability to “bounce back” from hardship), community trauma, and community wellbeing to help better understand community stress and develop metrics to monitor collective stress and preparedness in the event of adversity (Chandra et al, 2018). In this framework, social cohesion (described in Section 1.2.1.) is specified as an alleviating factor with regards to community allostatic load, with social connections and norms being important foundational issues that determine community stress and response.

However, geographic disparities in health cannot be entirely explained by levels of deprivation. This sentiment is captured by what researchers and media outlets call “the Glasgow effect” (Cowley, Kiely & Collins, 2016; Goodwin, 2016) – in reference to the significantly higher (premature) mortality and morbidity rates in Glasgow compared to other European regions (Cowley et al, 2016). Empirical investigations of the Glasgow effect have found that elevated rates of premature mortality are still detected even after adjusting for individual-level (McCartney et al, 2015) and area-level deprivation (Hanlon et al, 2005). Despite similar levels of deprivation, Glasgow has a premature mortality rate 30% higher than that of Liverpool and Manchester, indicating that place-based differences in health outcomes are likely to be driven by other contextual factors (Walsh, Bendel, Jones & Hanlon, 2010). Neighbourhood research in the context of health has most often focused on socioeconomic status, while neighbourhood physical environments have also emerged as a topic of considerable interest (Arcaya et al, 2016). Neighbourhood social environments have received relatively less attention (Arcaya et al, 2016). The tangibility of physical neighbourhood features, arguably, lends them more readily to intervention by stakeholders such as public health practitioners, urban designers, and local authorities. The physical and social aspects of neighbourhood environments are closely intertwined. Simplistically, “better” physical environments are conducive to “better” social interactions”, while amicable social environments are required to maintain conditions in the physical environments.

Determining “true” neighbourhood effects is challenging because place-based differences in health and risk behaviours are driven by a combination of compositional and contextual effects (Veenstra, 2005). Compositional effects refer to the characteristics of individuals that reside in a given neighbourhood whereas contextual effects refer to the characteristics of neighbourhoods themselves that operate beyond the individual-level (i.e., ecological effects). For instance, the percentage of single-headed households, aggregated to the neighbourhood-

level, would constitute a compositional effect since it is concerned with the make-up of an area, whilst the ability of a neighbourhood to control the behaviour of its residents would constitute a contextual effect. Multilevel analyses, which account for the clustering of individuals within spatial units, are “the only statistically viable way of distinguishing compositional from contextual effects” (Veenstra, 2005, p. 2062). These analyses must be theory-driven to avoid misattributing some proportion of variance to the individual-level and to appreciate synergistic relationships between compositional and contextual effects (Veenstra, 2005). Greater detail regarding the use of multilevel modelling and how it will be used in this thesis is provided in Chapter 3 (Section 3.4).

Patterns of health risk behaviours, such as alcohol use, tend to cluster in geographic space (e.g., neighbourhoods), which again reinforces the need for multilevel studies. However, independent contextual effects fail to explain differences in drinking behaviours as there are complex interactions between individual and place-based factors whereby alcohol involvement in certain physical or social situations is also determined by personal (i.e., socioeconomic and demographic) characteristics (Stanesby, Labhart, Dietze, Wright & Kuntsche, 2019). Auchincloss and Diez Roux (2008) propose six possible processes through which place-based trends in health (risk) behaviours may occur. They describe these processes in relation to physical activity, but the examples will be adapted here in the context of alcohol use. Firstly, neighbourhood characteristics (i.e., context), such as alcohol outlet density, can influence drinking. Secondly, individuals are “sorted” or “selected” into neighbourhoods “based on external constraints related to socio-economic resources and discrimination” (p. 2). In other words, what constitutes affordable housing may differ across people from various sociodemographic backgrounds and levels of resources, or some individuals/groups may be more likely to experience displacement.

Auchincloss and Diez Roux (2008) state that health-related behaviours (i.e. drinking) may be associated with these personal (rather than neighbourhood) features. Similar to this point, they also suggest that individuals *self-select* into preferable neighbourhoods. In relation to alcohol use, neighbourhoods with a higher ratio of on- to off-license premises might “attract” people who are more likely to drink in restaurants but who would not purchase alcohol to drink at home. Given evidence that health-related behaviours cluster together, it is also relevant to recall the original point made by the authors, which is that neighbourhoods with favourable environments in which to be active “attract” individuals who exercise regularly. These individuals may be less likely to engage in risky drinking since they exercise to maintain their health. Another potential explanation is that residents “adapt their behaviors in response to collective behaviors within their spatial (and social) network and wider geographic area” (p.

2), for example, observing regular social gatherings (that involve drinking) at a local venue may lead a person to conform to this behaviour, particularly if they feel isolated. On the other hand, neighbourhood environments may become more suited to the socioeconomic and demographic composition of the area. This might involve processes such as gentrification, which refers to the transformation of more disadvantaged neighbourhoods into areas that conform to newly-settled, more affluent residents' tastes. Arrival of new businesses targeted at middle-class patrons could influence the drinking habits of locals, but gentrification can also lead to displacement of less wealthy, long-term residents to outskirt areas. The drinking habits of these residents might also be impacted, potentially via mental health deterioration and stress (see Section 1.1.4.). Finally, Auchincloss and Diez Roux (2008) suggest that neighbourhoods "adapt in response to features of other neighborhoods or more distant places" (p. 2). A relevant example here may be the emergence of "no- and low-" alcohol products that have become increasingly popular in recent years (Corfe, Hyde & Shepherd, 2020). Substitution of higher-strength beverages for lower-strength or alcohol-free products in local shops and venues could result in lower overall alcohol consumption in the area. Indeed, recent evidence – albeit limited – is indicative of this, and further adds that "no- and low-" products are unlikely to act as a gateway to products with higher alcohol content among youth (Anderson, Kokole, Jané Llopis, Burton & Lachenmeier, 2022).

Neighbourhoods represent useful units at which to study alcohol use trends because drinking often occurs in a social setting, and individual drinking habits tend to conform to normative consumption patterns. Empirical evidence supports the "behavioural contagion" of drinking behaviours (Bräker & Soellner, 2017) and highlights how the prevalence of alcohol use behaviours is tied to the social (drinking) norms of a given population, whether this be at the network- or neighbourhood-level (or even broader socio-spatial unit). This observation is the foundation of Skog's (1985, 2001) theory of collective drinking cultures, which posits that changes in population-level mean alcohol consumption coincide with a collective shift in drinking behaviours towards the mean. Thus, it is theorised that reductions in average population-level alcohol use levels are likely to be followed by decreased alcohol-related harm, as even drinkers at the most severe end of the alcohol use spectrum should too exhibit reduced consumption (Raninen & Livingston, 2020; Skog, 1985; Skog, 2001). Skog (1985) notes that the collectivity phenomenon may not be applicable under certain conditions such as very low social cohesion, informal control over alcohol consumption, and limited alcohol availability. However, recent European research provides limited evidence for Skog's theory as collectivity – in hard (i.e., alcohol use changes in the same direction for all drinkers to the same extent) and soft (i.e., alcohol use changes in the same direction but at a variable extent) forms – has been observed in addition to polarised consumption patterns (Holmes, Ally, Meier

& Pryce, 2019; Loy et al, 2021). The authors of a UK study spanning 27 years found that cohort and period trends, as well as differences by gender and level of consumption, contributed to the mix of collectivity and polarisation (Holmes et al, 2019). Soft collectivity has been observed across socioeconomic groups (Landberg, Trolldal & Norström, 2020) but further empirical longitudinal research is needed to better test the theory (Raninen & Livingston, 2020). These findings reiterate the importance of further investigating social mechanisms underlying drinking behaviour.

Research suggests that disadvantaged neighbourhoods have a higher prevalence of substance use and related problems in comparison to more affluent areas (Chaix et al, 2006; Public Health England, 2020). Counterintuitively, higher rates of abstinence are also observed more frequently in disadvantaged areas compared to advantaged areas (NHS Digital, 2020b). Greater levels of alcohol-related harm are also experienced by residents of higher-deprivation neighbourhoods compared to those of lower-deprivation neighbourhoods, despite evidence that, overall, these populations drink at similar levels (Beard et al, 2019; Bellis et al, 2016). This finding is referred to as the alcohol harm paradox (AHP). Multilevel studies confirm that there is variation in health-related behaviours between neighbourhoods even after accounting for compositional factors (Pickett & Pearl, 2001). Although a higher proportion of variance in health outcomes, including alcohol use, is consistently reported at the individual-level than the contextual-level (Pickett & Pearl, 2001), even small changes in neighbourhood environments have the potential to elicit considerable individual-level effects in health and risk behaviours. This is because the consequences of macro- and meso-level change trickle down to impact individuals, as posited by socio-ecological models (Section 1.1.6.). Socio-cognitive theories (described in Section 1.1.4.) and evidence of behavioural contagion further suggest that individual health-behavioural responses to minor contextual changes may diffuse across networks and accumulate to produce wide-reaching public health benefits.

1.2. Neighbourhood social environments: Key theoretical concepts

Theorised biological, psychological, and social mechanisms underlying alcohol use behaviours are detailed in Section 1.1.4. of this chapter. This section draws on some of those theories to explain the role of neighbourhood environments in the relationship between mental health and drinking behaviours. Additional concepts of “social cohesion”, “social capital”, “neighbourhood disorder”, and “collective efficacy” are introduced. Their associations with psychological distress, mental disorder and alcohol use are then examined in Chapter 2.

1.2.1. Social cohesion

Social cohesion has been defined in various ways, but it is colloquially understood as the “glue that holds society together”. Most authors describe social cohesion as a group asset or trait, and others describe it as a process (Beauvais & Jenson, 2002; Carrasco & Bilal, 2016; Fonseca, Lukosch and Brazier, 2019). The Organisation for Economic Co-operation and Development (OECD, 2011) defines a cohesive society as one which “works towards the well-being of all its members, fights exclusion and marginalisation, creates a sense of belonging, promotes trust, and offers its members the opportunity of upward social mobility” (p. 17). Social cohesion, as defined by the OECD, is a composite of three dimensions: social inclusion, social mobility, and social capital (described below in Section 1.2.2.). In short, social cohesion refers to “connectedness” and “solidarity” in a given community, within which there are strong interpersonal bonds predicated on reciprocal relationships and an absence of “latent social conflict” (Kawachi & Berkman, 2000). Conceptualisations of cohesion in the social sciences often differ from those from a policy perspective, the latter of which typically uses concept as a means of providing solutions to problems rather than focusing on the theoretical basis (Chan, To & Chan, 2006). It is important to note that high levels of cohesion in adjacent neighbourhoods might heighten conflict and divide between those neighbourhoods, such as in the case of ethnic enclaves and other religious/non-religious communities situated in the same geographical area (Forrest & Kearns, 2001).

As a multidimensional concept, social cohesion has been measured, both at individual- and area-levels, using various indicators. Empirical studies generally use a combination of the following most commonly cited aspects of cohesion to assess effects of neighbourhood social environments on (health) outcomes: shared values, social control, willingness to help others in the neighbourhood, social capital and social interactions, and attachment to/identification with the neighbourhood (Forrest & Kearns, 2001; Schiefer & van der Noll, 2017; Oberndorfer et al, 2022). Fonseca et al (2019) propose a framework within which social cohesion can be studied, with consideration of the interdependent relationships between individuals, communities and institutions. In brief, individuals’ perceptions of norms and values drive their motivation to belong in a group, and their participation depends on whether the community provides norms and values that align with their own. However, individuals may also adopt the values and norms of groups that they feel similar to, respect and/or admire, which can facilitate integration into those groups, while transgression of the group’s norms can lead to the individual to be rejected from the group (Tajfel & Turner, 1979; Turner et al, 1987). At an

institutional level, the wider norms, values and laws determine whether individuals are able to actively participate at the community level. In this sense, cohesion at each level is closely related, and intervention or disturbance at any level is likely to impact cohesion at the other levels.

1.2.2. Social capital

1.2.2.1. Conceptual overview

Whilst there is no universally accepted definition of social capital to date, there is consensus that the concept relates to social connections and interactions that yield individual and/or collective benefits. In other words, the concept of social capital embodies the proverbial saying: “it’s not what you know, it’s who you know”. The main premise is that social ties have value, and that they are instrumental in soliciting resources, information, power, and social change. It can be argued that the concept of social capital was recognised in Durkheim’s (1897) seminal work on suicide. According to Putnam (1995), the most cited author in research utilising the concept, social capital is defined as “features of social organizations such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions” (p.167). This represents a “conceptual stretch” from the works of scholars such as Bourdieu (1986) and Coleman (1988a), as understanding of social capital has evolved into that of a community-level asset or “public good” as opposed to an individual- or network-level asset (Portes & Landolt, 2000). Bourdieu’s (1986) approach centres primarily around power relations and status, suggesting that social capital is inherently linked to (socioeconomic) class and focusing on the potential benefits to individuals rather than collective entities. From an economist and sociological standpoint, Coleman (1988a) puts forth a conceptualisation of social capital that suggests engagement in social interactions is determined via rationalisation. In the context of neighbourhood relations, residents that know one another via regular, brief interactions are connected by “weak” social bonds that can be understood as a form of bridging social capital (see Section 1.2.2.5.).

In this sense, social capital can be generated via repeated interaction. Some authors emphasise the importance of historical context, and as such, social capital is thought to be largely determined by the power dynamics, norms and resource reserves of previous generations that form the basis of present-day socialisation processes (Portes & Vickstrom, 2011). Regarding real-world initiatives to boost neighbourhood social capital (NSC), policies may be implemented to encourage resident participation in policy issues, support links

between local organisations, improve the sense of place-based identity (e.g. through aesthetic means), ensure resident safety via local crime prevention services, and support community interests and events (Forrest & Kearns, 2001). Putnam (1995) draws an analogy between changes in social capital and the first law of thermodynamics, questioning whether it is the case that social capital “is neither created nor destroyed, merely redistributed?”.

Social capital and social cohesion are closely linked with each other (Carrasco & Bilal, 2016; Lu & Peng, 2019). Some scholars suggest that the concept of social cohesion is broader and encompasses social capital (Kawachi & Berkman, 2000), whereas others conceptualise social cohesion as a cognitive facet of social capital (Almedom & Glandon, 2008; Whitley & McKenzie, 2005). Carrasco and Bilal (2016) make an important distinction drawing on Fromm’s differentiation between “having” and “being”. In line with many contemporary social capital scholars, they posit that social capital constitutes a pool of resources (e.g. trust, norms, networks) that can be owned (i.e. “having”) and maneuvered to accomplish their goals. They then argue that, unlike social capital, social cohesion cannot be owned by a single individual, as it is a characteristic “that is vested in a group”, reflecting a sense of togetherness (i.e. “being”). It is modern society’s fixation on “having” that they believe explains the dominance of social capital research over social cohesion research – a trend that persists as of July 2022 based on the current author’s replication of their PubMed search comparing the publication rate for the two concepts. Carillo Álvarez and Riera Romaní (2017) contend that “one can have social capital without social cohesion but not social cohesion without social capital” (p. 58). Contrary to this, other researchers suggest that social cohesion is a prerequisite for social capital (Carpiano, 2006). Nonetheless, there has been an exponential increase in papers related to both social capital and social cohesion since the early 2000s as the social determinants of health have gained recognition in public health (Arcaya et al, 2016; Riva, Gauvin & Barnett, 2007). The next section outlines two main approaches to social capital studies in the context of (public) health, which largely reflect different degrees of emphasis on “having” social capital and “being” a cohesive group.

1.2.2.2. Network approach vs. Cohesion approach

Social capital can be investigated from network- and cohesion-based approaches, which differ with regards to conceptualisation of social capital (Carillo Álvarez & Riera Romaní, 2017; Moore & Kawachi, 2017; Wu et al, 2018). The network approach focuses on mapping relationships between individuals (and in some cases, organisations) in order to better understand how social structures facilitate human behaviours. For example, social network

analysis and tools such as position generators can be used to characterise the nature of those relationships, identify where social inequalities lie, and where there may be what Burt (1992) refers to as “structural holes” or opportunities for “brokerage”. The cohesion approach is less egocentric and, as such, focuses more on the cognitive and structural components of social capital than on the configuration of social ties themselves. The cognitive dimension of (cohesion-based) social capital includes perceptions of trust and sense of belonging, for example, whereas the structural dimension refers to observable actions occurring between network members, such as social participation and civic engagement.

1.2.2.3. A critique of social capital

Prominent scholars in the field define and operationalise social capital in different ways, which differ by typology (i.e. bonding, bridging, linking; cognitive, structural, relational), level of analysis (i.e. individual, neighbourhood, state), and proxy indicators (e.g. trust, social participation, civic engagement). Social capital has come to be viewed by some as a “cure-all” to societal problems, which has sparked controversy in recent years. The concept has been widely applied across many disciplines, including the social sciences, education, (public) health, and criminology (Kawachi & Berkman, 2000; Schiefer & van der Noll, 2016), but its broad applicability has led to ambiguous conceptualisations that lack distinct meaning. This is also the case for social cohesion (Oberndorfer et al, 2022), which constitutes a cognitive form of social capital. Conceptualisations of social capital beyond the individual level have been criticised on the basis of tautology and circular reasoning because its definition, precursors to development, and anticipated benefits are indistinct from each other (Portes, 1998). In other words, a defining feature of social capital is trust; however, trust promotes social capital building, which facilitates more trust. Nonetheless, there has been greater clarity regarding the different dimensions of social capital in recent years. The points at which contemporary authors in social capital research typically diverge in their conceptualisations relate to the level(s) at which social capital is attributed, how social capital is operationalised, and the implications of having (or lacking) social capital (see Table 1 for an overview of conceptualisations of social capital according to prominent authors in the field).

Some academics question whether it constitutes ‘capital’ at all given the uncertainty associated with ownership of social capital and quantifying investments in relationships/networks (Adler & Kwon, 2002). Bourdieu discusses social capital in relation to three other types of capital: economic, cultural and symbolic. He suggests that social capital has multiplicative effects on one’s existing stock of capital, and the accompanying increase in

status enables power to be exerted over the shaping of norms, which advantage some individuals or groups more than others. Despite its often metaphorical usage, it is argued that it is a form of capital since it can be transformed into different types of capital and confers benefits when invested (Adler & Kwon, 2002). For example, Bourdieu (1986) contends that social capital “is convertible, in certain conditions, into economic capital and may be institutionalized in the form of a title of nobility” (p. 243). The reducibility of other types of capital to economic capital is explained as a function of time, whereby an individual’s usable time is afforded by having sufficient economic capital to “purchase” other people’s time (Bourdieu, 1986). Portes (1998) echoes Bourdieu’s (1986) view that exchanges entailing an investment in social capital may simply obscure the underlying economic motives of the action, but adds that the processes involved in acquiring other forms of capital often beget “unspecified obligations, uncertain time horizons, and the possible violation of reciprocity expectations” (p.4), unlike most economic exchanges.

Once mobilised, social capital can be a powerful stimulus for collective action and socio-political change. A large body of literature also suggests that social capital has important implications for health and wellbeing (see Chapter 2). Previous research has tended to emphasise the benefits of social capital and overlook its potential downsides. Coleman (1988b) theorises how the gains resulting from collective action may not be proportionately distributed across a given population, relative to each individual’s contribution to the cause. He distinguishes between ‘free riders’ – those whose goals are achieved via the efforts of others with the same goal, but who do not contribute, and ‘zealots’ – those who incur a greater cost than others pursuing the same goal and for seemingly little personal benefit. To explain the co-existence of free riding and zealotry within the same population, Coleman (1988b) posits that ‘encouragement to others’ may somewhat counteract the effects of free riding and promote zeal, especially when the achievement of one person’s goal aids in the goal attainment of others.

1.2.2.4. Cognitive, structural, and relational dimensions of social capital

From a social structure perspective, research suggests that social capital can be divided into three interrelated but distinct dimensions: structural, cognitive and relational social capital (Claridge, 2018a; Nahapiet & Ghoshal, 1998). Structural social capital refers to network configuration – the ties that link individuals or groups, the density of the network, and the roles and rules that govern relations between connected individuals. Unlike the tangibility of structural social capital, cognitive social capital refers to the extent of shared meaning and

understandings (e.g. values, language, goals), and so measurement typically relies on self-reported perceptions of cohesion. Relational social capital is described as the “affective part”, in that it pertains to the quality of social relationships, and thus overlaps with the concept of cognitive social capital. For example, trust, norms and aspects of identity may be categorised as either cognitive or relational social capital, depending on the definitions adopted. Claridge (2018a) notes that the primary difference between these two types of social capital is that the relational dimension is rooted in particular social relationships that an individual has, whereas the cognitive dimension refers to a broader set of relationships within a given context. Table 1 summarises typical indicators of cognitive and structural social capital. Note that the relational component is omitted from this table. From a public health perspective, social capital is more usefully conceptualised in its cognitive and structural forms since nuanced details about particular network dynamics are not typically accessible in large-scale datasets. A focus on relational social capital might be more aligned with psychological research that is more suited to examining individual differences and small-network characteristics, rather than population-level or regional trends.

1.2.2.5. Bonding, bridging and linking social capital

From a network perspective, social capital can be conceptualised as having three domains that capture the nature of social relationships: bonding, bridging and linking social capital (Claridge, 2018b; Szreter & Woolcock, 2004). Bonding and bridging social capital represent the “horizontal” dimensions and are accrued among individuals of similar levels of power or resources. Often referred to as “strong ties”, bonding social capital is characterised by high levels of trust and cooperation between similar individuals in a closed network, and who share some shared background, interest or other trait – such as in the case of close friendships. Bridging social capital instead encompasses what Granovetter (1973) refers to as “weak ties” that are generated between dissimilar individuals and unconnected networks. This form of capital is characterised by respect and harmony between heterogeneous social actors or their networks, and may be measured as proportion of friends with similar income/ethnicity or perceptions of whether people in the local area respect demographic differences between residents (Poortinga, 2012). Linking social capital represents the “vertical” dimension, which relates to ties between individuals and hierarchical sources of authority such as institutions and political entities. While this component is similar to bridging social capital, the crucial difference between the concepts is that power disparities are a salient aspect of the social relationships. For example, connections between community members and government officials, such as in the case of lobbying for local facilities, would exemplify linking social

capital. Indicators of linking social capital include political efficacy, trust (e.g. in government or police), activism, and participation (Poortinga, 2012).

As posited by social capital theory, social relationships constitute resources that can be drawn upon to attain personal and collective goals (Putnam, 1995; Bourdieu, 1986). Likewise, each of the three types of social capital described in the previous paragraph are theorised to have different functions and therefore impact health in different ways. Bonding social capital serves as a source of social support, which can confer mental health benefits via positive psychosocial processes but, since this type of capital is limited to relatively homogeneous networks, it is unlikely that new information will circulate around network members (Kawachi & Berkman, 2000). Bridging social capital allows novel ideas, resources and information to spread between dissimilar individuals, thereby extending across “structural holes” between unconnected networks (Burt, 1992). Finally, the role of linking social capital is to leverage information, resources and influence from institutional bodies (Szreter & Woolcock, 2004), which can be instrumental in soliciting neighbourhood amenities and enabling access to services. Evidence of significant but weak associations between these different social capital indicators lends support to the concepts of bonding, bridging and linking social capital as being distinct aspects of (neighbourhood) social environments (Poortinga, 2012). The links between NSC (and its theorised components) and health are explained in greater detail in Chapter 2 (general literature review).

1.2.2.6. Social capital trends

Putnam (1995) speculates on the declining social capital in the US since the 1950s. The decline of social capital is attributed to increasing numbers of working women, residential mobility, demographic changes, reduced participation in social clubs and religious affiliation, and technological innovation for entertainment purposes (Putnam, 1995). For decades, many scholars have alleged this ongoing decline in social capital across Western countries, but these claims have been met with opposition. Conceptual issues, contradictory evidence of the “corrosive” effects of ethnic diversity on social capital, and concerns that a “preoccupation” with waning trust levels “detract[s] attention from real and far more urgent problems” (p. 476) are examples of such critiques (Portes & Vickstrom, 2011). Furthermore, online communities have great potential for building ‘virtual’ social capital (Blanchard & Horan, 2000; Chiu, Hsu & Wang, 2006; Pénard & Poussing, 2010) as “the Internet can decrease the cost of investing in social capital and soften the depreciation rate of social capital” (Pénard & Poussing, 2010, p.

585), which contradicts the proposition that digitalising leisure has negative societal consequences.

Empirical evidence does not consistently support the idea that social capital is declining (Hall, 1999; Paxton, 1999; Sarracino & Mikucka, 2015). Social capital trends in Europe contrast with Putnam's (1995) assertion about declining levels in America. A study of multiple European countries (n=30) for the years 1990-2012 found social capital trends to be more complex than an outright decline (Sarracino & Mikucka, 2015). Based on ten proxy indicators, the results showed variable trends for different indicators as well as differences between countries. The authors also note that declining participation in post-communist countries should not be interpreted as "the erosion of civic society" since Western-centric definitions of social participation are not appropriate in such a situation where organisational membership is in state-controlled "bureaucratic institutions" under communist government (Sarracino & Mikucka, 2015). Another caveat is that research suggests contextual social capital is largely concentrated within the middle class, who are better connected to higher-status individuals and more engaged in civic matters (Hall, 1999; Li, Savage & Warde, 2008).

Nationwide analyses of recent social capital trends in the UK somewhat support Putnam's contentions. A report from May 2017 found that levels of social capital were relatively stable over the previous years, and that there were increases in civic engagement (assessed as volunteering) and the proportion of people who would stop and talk to their neighbours (Office for National Statistics, ONS, 2017). However, even prior to the COVID-19 pandemic, trust in the national government fell steeply by 2020, accompanied by smaller decreases in positive interactions with neighbours, sense of belonging, and organisational membership (ONS, 2020). Data for 2020-2021 suggests that social capital did not change significantly from pre-COVID-19 levels although some neighbourhood perceptions continued to worsen (e.g. trust in neighbours, willingness to help neighbours) (ONS, 2022). Experiences of social capital were linked to sociodemographic and area factors. For example, during 2020-2021, females were more likely than males to check on neighbours and perceive their local community would help them in times of need, and only the 16-24 age group reported increases in civic activism. Trust in neighbours did not differ by sex but higher scores were observed in rural areas compared to urban areas. The evidence indicates that the urban-rural gap in neighbourhood trust had narrowed, primarily due to a steeper decline in neighbourhood trust in rural areas than in urban areas.

Table 1 - *Approaches, dimensions, and indicators of social capital*

Conceptual approach to social capital	Types of social capital	Indicators of social capital
Dimensional categories	Cognitive	• Social cohesion (e.g. social interaction, sense of belonging) • Norms and values (e.g. social support, collective goals, civic norms, shared values, reciprocity)
	Structural	• Trust (generalised and interpersonal) • Network structure (e.g. network size and density, strength of ties, structural holes, network homogeneity) • Civic and social engagement (e.g. membership in organisations, volunteering, political participation) • Formal and informal social roles and rules
Functional categories	Bonding	• “Strong” social ties such as those with family and friends – typically among denser networks of people who are similar to each other
	Bridging	• “Weak” social ties between people who are different from each other, for example, in terms of sociodemographic identities (e.g. social class, ethnic background)
	Linking	• “Vertical” social ties between people (and/or organisations) across different social strata or levels of power

1.2.3. Other relevant concepts: Neighbourhood disorder, social disorganisation, collective efficacy, and fear of crime

Before summarising the concepts of “neighbourhood disorder”, “social disorganisation”, and “collective efficacy”, it is important to note that much of this literature is rooted in criminological and sociological theory. Early stages of this work focused primarily on spatial configurations of crime and delinquency rather than health outcomes. However, these theories have been reformulated and applied to psychological and public health research given that they share similarities with Durkheim’s (1897) seminal works on the social determinants of suicide.

Neighbourhood disorder is conceptualised as social and physical signs of weakened social control, which can adversely impact the health and wellbeing of residents (Ross & Jang, 2000; Ross & Mirowsky, 2001; Sampson & Raudenbush, 1999). Social aspects of neighbourhood disorder include public drug use and drunkenness, sex work, loitering and other antisocial behaviours, whereas physical aspects of neighbourhood disorder include abandoned cars and buildings, graffiti, and litter (Sampson & Raudenbush, 1999). There is strong evidence that neighbourhood disorder increases the risk of mental distress (Baranyi et al, 2020; Diez-Roux & Mair, 2010; Galea, Ahern, Rudenstine, Wallace & Vlahov, 2005; O’Campo, Salmon & Burke, 2009; Silva, Loureiro & Cardoso, 2016; Steptoe & Feldman, 2001). This finding is consistent

across high-income countries, with low country-level variance in depression risks associated with neighbourhood disorder being explained by potential moderating effects of contextual factors like (country-level) population density and income inequality (Baranyi et al, 2020). However, in a sample of over 4,000 participants from disadvantaged neighbourhoods in London, one study found that high neighbourhood disorder was associated with a 59% decrease in the odds of common mental disorder compared to areas with low neighbourhood disorder (Bertotti et al, 2013). The authors proposed that this finding emerged because engagement in “neighbourhood incivilities” (i.e., indicators of neighbourhood disorder like graffiti, public drinking) could be considered a type of “social activity” – which was included in the model as “social networks” (i.e., structural social capital) and found to protect against mental disorder. The adverse impact of neighbourhood disorder on mental health may be moderated by age – with some evidence that the effects of neighbourhood disorder are weaker for older adults (aged 60+) than for middle-aged adults (aged 40-59) (Pai & Kim, 2017). Pai and Kim (2017) suggest that old age may reflect wisdom and resilience, which are useful for coping with neighbourhood stress, and point to the status discord perspective (i.e., neighbourhood disorder is more threatening to middle-aged adults because they tend to have greater social status, social networks, and resources, compared to their older-age counterparts) as a potential explanation for this finding. Theoretical and empirical work suggests that neighbourhood disorder itself is an important mediator in the association between area disadvantage and individual psychological distress or mental disorder (Kim, 2010). Neighbourhood disorder is also a risk factor for problematic drinking patterns such as more frequent or severe alcohol use (Echeverría, Diez-Roux, Shea, Borrell & Jackson, 2008) and abuse/dependence (Martin-Storey et al, 2013).

Higher levels of neighbourhood disorder are typically observed in more disadvantaged areas (Ross & Mirowsky, 2001), which may be explained by social disorganisation theory (Sampson & Raudenbush, 1999; Shaw & McKay, 1942). Social disorganisation refers to “the inability of a community structure to realize the common values of its residents and maintain effective social controls” (Sampson and Groves, 1989, p.777). This lack of capacity for shared values and social control theoretically stems from ecological factors including concentrated disadvantage, residential instability (i.e., residential turnover, or sometimes referred to as “social fragmentation”), and ethnic heterogeneity (Sampson & Raudenbush, 1999), which are the most common indicators used to operationalise neighbourhood social disorganisation in empirical studies. Research has also found these proxies to be associated with a higher likelihood and severity of mental distress and morbidity, which may operate by weakening social ties (Diez-Roux & Mair, 2010). Similarly, higher social disorganisation is also associated with greater risk of substance use disorders (Cambron et al, 2017; Chaix et al, 2006) and

negative alcohol-related consequences (Perez et al, 2022). “Social disorganisation” and “neighbourhood disorder” overlap to some degree, but inconsistencies in how they are conceptualised add to the challenge of establishing mechanisms that explain how neighbourhoods affect health (behaviours). For example, drug-selling and graffiti have been used to measure neighbourhood social disorganisation (Rhew, Kosterman & Lee, 2017), though they are conceptually more aligned with neighbourhood disorder.

Stemming from social disorganisation theory, the concept of “collective efficacy” is theorised as “social cohesion among neighbors combined with their willingness to intervene on behalf of the common good” (Sampson, Raudenbush & Earls, 1997, p.918). Collective efficacy may be perceived as the antithesis to social disorganisation, yet collective efficacy theory offers a more nuanced and, to some extent, contradictory explanation of neighbourhood incivilities. While social disorganisation theory contends that denser networks characterised by strong social ties should deter crime, collective efficacy theory recognises that this is not necessarily true, such as in the case of gang membership. Divergence from the original theories led to greater emphasis being placed on weak social ties (Granovetter, 1973), which embody social cohesion. This is because, through active involvement in neighbourhood matters (e.g. organisations, activities, politics), a greater volume of weak (rather than strong) bonds are generated, which facilitates informal social control. Thus, studies typically operationalise collective efficacy as a composite variable that includes social cohesion and informal social control (Donnelly et al, 2016; Fagan, Wright & Pinchevsky, 2015; Jackson, Denny, Sheridan, Zhao & Ameratunga, 2016; Suarez et al, 2022). Overall, higher levels of social disorganisation correlate with lower perceived social cohesion and lower social control (Pabayo, Grinshteyn, Avila, Azrael & Molnar, 2020).

Research often draws on the stress process model (Pearlin, Menaghan, Lieberman & Mullan, 1981; Pearlin, 1989) to explain the mechanisms through which social disorganisation and neighbourhood disorder influence residents’ mental health (Cho, 2022). The stress process model, as applied to this context, suggests that these neighbourhood features constitutes “ambient”, chronic stressors that elicit secondary stressors which are detrimental to mental health (Cho, 2022). Specifically, indicators of social disorganisation impinge on the development and maintenance of social relationships from which social support can be obtained to buffer stress, and through which shared efforts to address local problems are sustained. For example, social ties are particularly fragile in neighbourhoods with high residential turnover since they must be rebuilt upon the arrival of new neighbours, whereas ethnic heterogeneity can hinder effective communication between residents, which ultimately prevents the formation of shared goals. Poverty and disadvantage concur with fewer

socioeconomic and material resources to draw on for leisure, as well as poorer access to facilities in which social interactions would take place. This highlights the close links between social disorganisation, neighbourhood disorder, and social capital. Further research is required to establish the mediating and/or moderating roles of psychosocial factors in the relationships between social disorganisation, neighbourhood disorder, and mental health problems. Cambron and colleagues (2017) found that, across an 18-year study period (6 waves of data), higher neighbourhood disorganisation was linked to higher AUD symptom scores, an association that held after adjustment for socioeconomic covariates and AUD slope. They also reported an indirect mediating effect of psychological distress on the relationship between neighbourhood disorganisation and AUD symptoms, that remained significant after adjustment for covariates. There is also emerging evidence that the relationship between neighbourhood disorganisation and drinking alone is moderated by mover status (Perez et al, 2022). In comparison to moving into a neighbourhood with the same level of perceived disorganisation, moving into a neighbourhood with higher perceived disorganisation increases the risk of drinking alone (Perez et al, 2022).

1.2.4. Social policy and social infrastructure

Health promotion initiatives and frameworks to reduce social inequalities often emphasise the importance of community environments and empowerment. For example, the Ottawa Charter highlighted the need to “create supportive environments” characterised by reciprocity and safety, and to “strengthen community action” as a means to improve social support (WHO, 1986). Seventeen “Sustainable Development Goals” were adopted by the United Nations in 2015 to achieve the 2030 Agenda for Sustainable Development, which “provides a shared blueprint for peace and prosperity for people and the planet, now and into the future” (United Nations, n.d.). While specific terms such as “social cohesion” or “social capital” are not mentioned, they are alluded to with regards to several of the goals, as partnerships, safety and social inclusion are key foci of the global strategy. These initiatives recognise the interlinkages between health and wellbeing, socioeconomic development and environmental factors – suggesting that reducing social inequalities and addressing heavy alcohol consumption go hand in hand (Collin & Casswell, 2016). In the UK, the “Levelling Up” programme launched by the Conservative party sets out an agenda to tackle a number of national inequalities in health, education, and local areas by 2030. One of the main goals of this programme is to “restore a sense of community, local pride and belonging, especially in those places where they have been lost” (Department for Levelling Up, Housing and Communities, 2022, p.3) by allocating funding to: promote and preserve culture (e.g.

museums, galleries), reduce inequalities in access to natural and recreational spaces, improve housing quality, and prevent crime and drug use. The official report explicitly states that building “social capital” is key to achieving Levelling Up goals, which focus strongly on tackling inequities across the country.

“Social infrastructure” refers to “physical places or organizations that shape the way people interact” (Klinenberg, 2018, p.5), such as parks, libraries, recreational centres, hospitality/retail venues, places of worship, and transit (Latham & Layton, 2019). Even places visited for seemingly mundane errands can hold a deep cultural significance that has an impact on people’s health and wellbeing. By providing shared spaces for residents to connect with one another, the built environment can facilitate the development of social capital and associated wellbeing benefits. Improvements in social capital and mental health have been associated with development of social infrastructure via community-led organisations in the UK (Hutcheon & Steiner, 2022). However, creation and maintenance of social infrastructure is dependent on adequate funding, and research points to “social infrastructure deserts” (Heseltine Institute for Public Policy, Practice and Place, 2021). These are primarily low-income neighbourhoods lacking in the amenities and resources they need to stimulate socioeconomic growth and boost wellbeing. Area-based inequalities have potentially life-long consequences for health, and social deprivation can limit the potential of strategies such as ABCD. Izenberg and Fullilove (2016) proposed a model that emphasises the importance of “main streets” – the US equivalent of UK high streets – for public (mental) health. They contend that fleeting social interactions between strangers on high streets help to generate “weak” bonds that form the basis for social cohesion. In short, it is suggested that “hospitality” is “the multi-level substrate of sociability in the built environment, and thus a foundation for health” (p.293), hence it is crucial that adequate funding and policies are in place to ensure the provision of hospitable main streets and preservation of communities’ cultural heritage (Izenberg & Fullilove, 2016). This notion builds on previous work examining social disorganisation theory, which suggests that “weak” ties elicit informal social control since brief social encounters (such as those on main streets or at local facilities) lead residents to better understand the habits of other people in their neighbourhood (Taylor, 1997). This sheds light on how the built and social environment may exert differential effects on health yet are tightly interlinked.

Concepts such as “compact cities”, “15 minute cities”, and “20-minute neighbourhoods” have generated significant interest in urban planning and public health, as a means of improving accessibility to amenities and social interaction within local areas, without necessitating long-distance travel or vehicle ownership (Thornton et al, 2022). The idea behind 20-minute neighbourhoods is that all of the services and amenities needed for residents to meet their

daily needs are located within 20 minutes walking distance. Providing that residents walk to their destinations, this is likely to have good prospects for physical health (due to increased physical activity) as well as psychosocial wellbeing and neighbourhood cohesion. However, the 20-minute neighbourhood concept has provoked backlash, including public protests, from some of the British population who have expressed concern about social control and the loss of personal freedoms (Silva, 2023). There has been a lack of specificity regarding the criteria used to implement and evaluate 20-minute neighbourhoods, although essential facilities such as healthy food vendors, recreational and community assets, public spaces and transport links have been adopted for operationalisation (Thornton et al, 2022). It has been suggested that social infrastructure indexes for assessing neighbourhood assets should be developed in collaboration with communities (Heseltine Institute for Public Policy, Practice and Place, 2021). For example, community-based focus groups are likely to offer a better understanding of where social infrastructure inequalities lie than generic indicators that are typically context-blind and directed by institutions.

Assets-based community development (ABCD)

Assets-based community development (ABCD) has gained increased attention, particularly in the UK, as an approach to tackling local health inequalities (Harrison et al, 2019; Heseltine Institute for Public Policy, Practice and Place, 2021). By taking a strengths-based (i.e., “assets-based”) approach, ABCD capitalises on what communities already have in terms of the skills or “gifts” of their members and “place-based” assets, such as culture, greenspace and architecture. The main emphases of ABCD are cooperation and empowerment of locals, which enable sustainable community development and subjugation of institutional power over neighbourhood issues. This differs from the traditional deficits-based approach that focuses on identifying community problems and needs for institutions and organisations to intervene. In this sense, institutional aid reinforces the power imbalance between organisations and residents, as communities come to rely on these provisions, which are exhausted over time as funds dwindle (Harrison et al, 2019). Pioneers of the ABCD approach, Kretzmann and McKnight (1996), also stress that “a number of society’s most influential institutions have themselves developed a stake in maintaining that focus” (p.24), so residents lack control over what neighbourhood issues are prioritised, what interventions are implemented in their area, and how these programmes are rolled out. While support and investments from outside of the neighbourhood are still vital to successful development, these contributions are more likely to be effective when communities are built on strong social relationships so that residents (and

local organisations) can work together to establish goals and collectively decide what resources would help to achieve them (Kretzmann & McKnight, 1993).

The process of ABCD begins by “mapping” the assets of a given neighbourhood/community – documenting specific organisations and individuals (e.g. community leaders) or their titles, and identifying where contact has already been established so that partnerships can be developed (Heseltine Institute for Public Policy, Practice and Place, 2021; Kretzmann & McKnight, 1993). This is followed by identifying traits of effective leaders and “activists” (i.e., individuals or groups who will help with the work) and charting what different groups and services can offer each other, so to strengthen partnerships. For example, the relationship between community youth and other residents could be strengthened for mutual gain whereby a “crime patrol” youth group informally oversees the neighbourhood (e.g. looking out for vulnerable people, discouraging playground conflicts), which creates a safer local environment and provides the youth with recognition and opportunities to showcase their work/skills to other groups. Building relationships, exchanging knowledge, and establishing a shared vision for the neighbourhood stands local stakeholders in good stead for soliciting external resources. The appeal of ABCD reaffirms the importance of examining NSC as a health determinant. The ABCD approach itself relies on group cohesion to form and attain community-driven goals, while its long-term sustainability and prosperity hinges on the cooperative relationships afforded by – and characterised by – social capital. Another core aspect of ABCD is ownership, whereby accountability is shifted from large institutions to the local organisations and actors. Although this allows a greater degree of self-governance (of the neighbourhood by citizens), professionals with experience of ABCD have expressed caution regarding the handling of potential problems associated with ABCD in the field, particularly when intervention is overseen by both services and local organisations/actors. Due to the bureaucratic configuration of health and social services, they often lack trust from citizens – especially those from disadvantaged areas. Practitioners and local authority figures are therefore concerned about the role of services in carrying out procedures like risk assessments, which lends them a further degree of control over matters, albeit to protect the people (Harrison et al, 2019).

1.3. Impact of the COVID-19 pandemic

Neighbourhood research on health outcomes is of increased importance following the COVID-19 pandemic. An outbreak of coronavirus-2 (also known as SARS-CoV-2 and referred to as COVID-19 in relevant sections of this work) was first declared by the WHO in January 2020 and later classified as a pandemic in March of the same year. This virus is primarily spread

via close contact, so governments globally enforced social distancing measures alongside “stay-at-home” guidance. Infection control measures in the UK involved multiple national lockdowns, restrictions on social gatherings and travel, closure of schools and amenities, and mandatory wearing of face masks (Office for National Statistics, 2021). In addition to these measures implemented by the government, Britain experienced a sense of uncertainty and fear related to the viral threat, political unrest, mass furloughing of employees, increased barriers to accessing medical and psychological support, adverse economic consequences, and “panic buying” in response to (and which exacerbated) shortages of essential items such as food and other household goods (David, Visvalingam & Norberg, 2021).

The pandemic and measures to control the spread of COVID-19 led to adverse psychosocial consequences such as increased feelings of isolation and loneliness, stress, and boredom, as well as poorer subjective wellbeing and a heightened incidence of CMDs (Bonomi Bezzo, Silva & van Ham, 2021; O'Donnell, Cárdenas, Orazani, Evans & Reynolds, 2022). One cross-sectional study found that long-term pre-lockdown abstinence from alcohol did not protect against relapse during lockdown in the UK (Kim et al, 2020), while another reported that off-trade alcohol sales increased in the highest quintile of alcohol buyers by 17 times more than the lowest quintile (i.e., those who bought the most alcohol prior to the pandemic bought even more during the pandemic) (Anderson, O'Donnell, Jané Llopis & Kaner, 2022). An examination of changes in mental health and alcohol use during the COVID-19 pandemic showed increases in both binge drinking and psychological distress from pre-lockdown to during lockdown (April 2020), despite self-reported loneliness being largely unaffected in all age groups besides 18-24 year olds (Niedzwiedz et al, 2021). Perceived neighbourhood social environments also worsened during the pandemic (Borkowska & Laurence, 2021), while positive neighbourhood perceptions protected against pandemic-related psychological harms (O'Donnell et al, 2022). However, research reveals social inequalities in the impact of COVID-19, with residents of disadvantaged neighbourhoods, minority groups, individuals with fewer socioeconomic resources, and elderly and youth populations experiencing a disproportionately higher burden of the pandemic (Bonomi Bezzo et al, 2021; Borkowska & Laurence, 2021; Shadmi et al, 2020; Stok, Bal, Yerkes & de Wit, 2021). The deterioration of neighbourhood social cohesion in England occurred across both behavioural (e.g. talking with neighbours) and cognitive (e.g. trust in neighbours) dimensions, and was most prominent in disadvantaged communities (Borkowska & Laurence, 2021). Since people generally spend a substantial amount of time in their residential area, these environments constitute opportunities for improving public health.

1.4. Aims and research objectives

The overall aim of the programme of research described in this thesis was to investigate how neighbourhood social environments influence alcohol use. The research first sought to develop a novel conceptual framework that illustrated hypothesised causal pathways from neighbourhood social factors to drinking behaviours. This was then used to guide further quantitative and qualitative studies. Quantitative examination of these relationships within a multilevel framework and with a longitudinal design helped to map drinking trajectories and determined the role of neighbourhood factors in predicting change. Qualitative exploration of residents' views then shed light on the perceived importance of neighbourhood factors relevant to drinking practices and explored whether these differed between high and low SES areas.

To achieve these aims, the programme of research had the following objectives:

1. To examine the direction and strength of quantitative associations between NSC and individual alcohol use;
2. To identify mechanisms underlying the relationship between NSC and individual alcohol use, and to develop a conceptual framework demonstrating the pathways from NSC to individual alcohol use;
3. To examine the role of NSC in predicting drinking practices and alcohol consumption trajectories in the English general population;
4. To engage Merseyside residents in participatory research that explores their perceptions of how their local areas affect their drinking behaviours, and how they think these areas could be improved to mitigate alcohol harms or aid drinking reductions;
5. To triangulate findings from the three studies to generate a deeper understanding of how NSC influences alcohol use.

1.5. Overview of the thesis

Chapter 2 includes a non-systematic review of literature that pertains to the roles of deprivation and social capital – conceptualised at multiple levels (e.g. individual-, household- and area-level) – in determining alcohol use and mental health outcomes. The chapter also discusses some methodological issues common in neighbourhood research.

Chapter 3 describes the methodological approach taken throughout this programme of work. The chapter provides an overview of the pragmatic paradigm adopted for this mixed methods research and the rationale for the three individual studies. It also includes a summary of the data mapping exercise conducted to identify an appropriate dataset for secondary analysis, ethical considerations for conducting community-based participatory research, and a description of the approach to triangulating the findings all three studies.

The methods, results, discussion of findings, and evaluation of strengths and limitations of the three studies conducted throughout this programme of work are reported in Chapters 4, 5 and 6.

Chapter 7 explains the triangulation protocol used to integrate and compare the findings from all three studies, includes a legitimisation process to increase transparency and validity of the triangulation process, and presents the triangulated findings mapped onto the overall thesis objectives. The chapter also discusses the strengths and weaknesses of the thesis as a whole and provides recommendations for research, policy and practice, before concluding with final remarks.

1.6. Position of the researcher

I reflected on my vocational and personal experiences prior to commencing the studies comprising this thesis, and also repeatedly throughout the entire process. This is because my past experiences can influence the methodological design and interpretation of findings, thus potentially leading to biases in the research output. After graduating with a Master's degree in psychology, I worked as a research assistant investigating self-recognition of alcohol problems and alcohol treatment services for (ex-)military personnel. These academic experiences provided me with strong foundations for conducting research, as they involved a combination of qualitative and quantitative skills. However, I am aware that, despite having developed a greater understanding of alcohol-related matters, I do not have experiential knowledge of working professionally in addiction services or undergoing alcohol treatment myself.

I lived in Birmingham (West Midlands) throughout my childhood then I relocated to Liverpool (North West) when I was 18. My lay experiences of "neighbourhood" environments were starkly different both between and within the two cities, which has given me insight into some of the different social dynamics that occur within English metropolitan areas. I have lived in flats for almost all of my life, and this is likely to affect my understanding of what it means to

be neighbours – particularly given the close proximity to other residents. Until involvement in this work, I had never visited a community centre before, nor been affiliated with local organisations, so I have approached the qualitative study with minimal preconceptions about the role of these facilities in neighbourly interactions and health. My adult life has been spent residing in, or on the outskirts of, the city centre, so I have little experience of life in suburban Merseyside neighbourhoods and, through the lens of sociology, I may be considered a “gentrifier”. Considering my position of power, which is especially pertinent to study 3, I am fortunate to have had access to higher education and the opportunity to work towards a PhD. This in itself has shaped my understanding of social capital as I have come to understand the institutional links derived from affiliation with Liverpool John Moores University as a source of power. I realise that there are many barriers to social mobility and wellbeing that can have a lasting impact across the life course, and I strive to complete this work with acknowledgement of my privileges and with appreciation for the diverse backgrounds of the study populations recruited to conduct this research.

To mitigate the potential biases resulting from my prior experiences, I regularly revisited the conceptual framework developed in study 1, which was constructed with consideration of both theoretical and empirical evidence. This helped to guide the design and interpretation of the subsequent studies but, in line with the pragmatic paradigm adopted, there was a degree of flexibility. The framework could be altered to reflect important findings from studies 2 and 3, which helped to fill any knowledge gaps or address conflicting evidence in the framework. I frequently re-examined the aims of each study to prevent diverging from the topic at hand and using the advice offered by my supervisory team to evaluate and guide the research.

CHAPTER 2: General literature review

2.1. Aim of the literature review

The overarching aim of the general literature review is to summarise concepts relevant to neighbourhood environments and examine their role as determinants of mental health and alcohol use.

This section will include:

- A summary of the impact of individual- and neighbourhood-level deprivation on mental health and drinking behaviours;
- An in-depth account of literature regarding associations between neighbourhood social concepts, mental health, and alcohol, with further consideration of the interplay with deprivation;
- A discussion of methodological issues in neighbourhood research.

2.2. Search strategy

This was a non-systematic review. The databases PsycINFO, Scopus and MEDLINE were searched using various combinations of the search terms listed in Table 2 in July 2020 and then intermittently throughout the three-year course of study. The searches were limited to articles published in English and were not restricted by publication date or study location. Further searches on Google Scholar were carried out to identify other relevant articles to supplement those retrieved from the initial database searches. Reference lists were also hand-searched in a non-systematic manner to broaden the scope of the review materials. Grey literature and book chapters found through any of these means were included where appropriate. Articles relevant to the aims stated in Section 2.1. were included and narratively synthesised. Research focused on social capital only in the context of disaster research (e.g., community recovery in the event of a hurricane, tsunami, drought) was excluded since this concerns specific, catastrophic incidents that are not commonplace in most Western countries and the social dynamics investigated are likely to be different to those in countries that do not regularly face extreme weather. Immigrant health, minority stress, and topics of interest (Table 2) contextualised in low-middle income countries are discussed only briefly for similar reasons (i.e., unique experiences of these populations that are not generalisable to general populations in high-income countries).

Table 2 - Literature review search terms

Topic	Search terms
Neighbourhood	neighbourhood* OR OR community* OR context* OR environment* OR local*
Deprivation	socioeconomic OR socio-economic OR "social class*" OR "social position*" OR "depriv*" OR poverty OR disadvantage* OR low-income
Social concepts	"social capital" OR "social cohesion" OR "neighbourhood cohesion" OR "social disorganisation" OR "social disorganization" OR "neighbourhood disorder" OR "collective efficacy"
Alcohol (and other risk behaviours)	alcohol* OR drink* OR drunk* OR substance* OR addict* OR drug*
Mental health	"mental health" OR psycholog* OR distress* OR anx* OR depress* OR "mental disorder*" OR "mental illness*" OR "psychiatr*"
Methods	theor* OR model* OR framework* OR qualitative* OR "latent class*" OR "latent growth" OR "growth curve*" OR "finite mixture model*" OR "trajector*" OR "typolog*" OR multilevel OR photovoice OR participatory OR community-based

2.3. Contextual-level variance in mental health and alcohol use

Research shows that some variance in psychological (Han, 2019; Secretti et al, 2019; Tseliou & Ashfield-Watt, 2022), alcohol-related (Fagan et al, 2015; Kuipers, van Poppel, van den Brink, Wingen & Kunst, 2012; Martin, Inchley & Currie, 2019; Nie, Zhu, Fu, Dai & Gao, 2018; Scribner, Cohen & Fisher, 2000), and other health-behavioural outcomes (Riva et al, 2007; Pickett & Pearl, 2001) can be attributed to differences between neighbourhoods. Similarly, Han (2019) demonstrated that there was a higher variation in self-reported stress at household-level (37.67%) than at area-level (5.01%) in a South Korean sample, after controlling for socioeconomic and demographic factors, area disadvantage and social capital at various levels. A large Brazilian study of over 10,000 adults from 1,855 neighbourhoods found that 2.3% of the variance in CMD was due to neighbourhood differences (Secretti et al, 2019). Other research suggests that the variance in mental health explained at the individual level is nearly twice that explained at the ecological level (Tseliou & Ashfield-Watt, 2022). These findings indicate that proximal influences on drinking behaviours are stronger than more distal influences. However, in over 100,000 individuals from 23 countries, Grittner and colleagues' (2020) analysis of country-level versus (within-country) regional variance in alcohol use showed that 2% of variance in heavy drinking and binge drinking was attributed to the regional level whereas 13% and 16% of the variance respectively was explained at the country level. They add that variation due to regional differences and gender differences is

lower in higher income countries compared to low-/middle-income countries (Grittner et al, 2020). Evidence indicates that a greater portion of contextual variation in alcohol use behaviours is found for females compared to males (Grittner et al, 2020; Nie et al, 2018), which may reflect macro-level structural factors like norms and attitudes towards women's alcohol consumption. An analysis of Scottish adolescents found that variation in drinking-to-cope motives can also be explained by neighbourhood differences (2.9%), even after accounting for school-level variance (Martin et al, 2019). A lower proportion of variance in alcohol use behaviours at the neighbourhood-level compared to the individual-level is expected, and interventions eliciting small contextual effects can have a major impact on individual-level health outcomes. A much greater portion of variation in "social cohesion" is similarly found between individuals in comparison to between neighbourhoods (Oberndorfer et al, 2022).

2.4. Deprivation and mental health

Research repeatedly shows that lower socioeconomic status is predictive of poor mental health and worse overall health (Diez-Roux, 2001; Diez-Roux & Mair, 2010; Dowdall, Ward & Lund, 2017; Evans & Kantrowitz, 2002; Fone et al, 2014; Hashmi, Alam, Gow & March, 2021; Jokela, Batty, Vahtera, Elovainio & Kivimäki, 2013; Link & Phelan, 1995; Reiss, 2013; Salvatore & Grundy, 2021; Silva et al, 2016; Stafford et al, 2008; Sui, Ettema & Helbich, 2022; Verhaeghe & Tampubolon, 2012). However, the psychological impact of deprivation differs depending on individual sociodemographic characteristics and the level at which deprivation is measured. For example, neighbourhood disadvantage has been found to increase symptoms of depression in women but not men (Bassett & Moore, 2013). In addition to the adverse psychological impact of SES-related stressors, low SES is associated with neurocognitive changes that impact executive functioning and emotional processing (Hackman, Farah & Meaney, 2010). As such, there is a higher need for mental health treatment in disadvantaged areas (Baker, 2020). Despite this, disadvantaged areas have lower treatment rates than affluent areas, and more privileged individuals (i.e., higher SES) have higher odds of accessing both public and private psychotherapy services (Jokela et al, 2013). Longitudinal analyses show that worsening socioeconomic conditions also exacerbate mental health inequalities, with the most disadvantaged neighbourhoods suffering the most severe psychological deterioration (Fone et al, 2014). Length of residence may, in part, explain this trend because long-term residence (i.e., 10+ years) in disadvantaged neighbourhoods is associated with poorer baseline mental health and a slower rate of (mental health) improvement compared to long-term residence in wealthier areas (Stafford et al, 2008).

2.5. Deprivation and alcohol use

There is conflicting evidence regarding the effects of neighbourhood deprivation on alcohol use. Neighbourhood advantage is also found to predict higher alcohol involvement among young US adults, with the proportion of higher-educated residents being the “active ingredient” in this effect (Slutske, Deutsch & Piasecki, 2016). Disadvantaged neighbourhoods are more likely to have neighbourhood norms that are more tolerant of drunkenness (Sampson & Raudenbush, 1999), which are associated with higher rates of binge drinking (Chauhan et al, 2016). Other research has found no association between neighbourhood deprivation and alcohol outcomes such as drinking within guidelines and drunkenness (Karriker-Jaffe, 2013), or mixed effects regarding alcohol outcomes (Karriker-Jaffe, 2011).

Epidemiological research points to an “alcohol harm paradox” (AHP), whereby people occupying a lower SES suffer disproportionately greater alcohol-related harms than those occupying a higher SES, despite drinking at similar levels overall (Beard et al, 2016; Bellis et al, 2016; Boyd et al, 2022; Jones, McCoy, Bates, Bellis & Sumnall, 2015; Lewer, Meier, Beard, Boniface & Kaner, 2016). This may be explained by socioeconomic patterning of drinking behaviours (Fone et al, 2013). For example, binge drinking is more prevalent in disadvantaged areas (Bellis et al, 2016) but excess consumption (i.e. drinking above recommended limits but less than binge drinking) is less prevalent in disadvantaged areas than in more affluent areas (Fone et al, 2013). Differences in beverage choices may also explain the AHP since wine-drinkers more often reside in affluent areas while low-SES individuals are more likely to prefer beer or cider (Jones et al, 2015). A recent systematic review of possible causal mechanisms underlying the AHP found 41 different explanations for this phenomenon, which were categorised into six overarching domains: individual, lifestyle, contextual, disadvantage, upstream, and artefactual (Boyd et al, 2022). Individual explanations focused on genetic factors that are not amenable to change, as well as other psychological and biological factors. Lifestyle explanations related to health-behavioural choices and clustered risk behaviours, whereas contextual explanations focused on proximal environmental factors like drinking contexts, protective social factors (e.g. marriage) and place-based factors. Disadvantage was theorised to contribute to understandings of the AHP via differential experiences of poverty and SES trajectories over the life course, and upstream factors resembled those described as “macro-level” factors in Section 1.1.6. (e.g. alcohol policy, socio-economic/-political factors). Finally, artefactual explanations suggested that the AHP arose from methodological flaws, but the authors concluded that the paradox is unlikely to be explained by measurement error or under-representation of disadvantaged individuals who drink at higher levels. The underlying

mechanisms of this relationship have still not been agreed upon and there has been little empirical testing of possible mechanisms besides those related to lifestyle (i.e., risk behaviours).

One of the main barriers to understanding the AHP is establishing the direction of the relationship between deprivation and alcohol use problems. A conceptual model posited by Jones and Sumnall (2016) and informed by review findings outlines pathways from deprivation to alcohol use and related problems. The model incorporates the social causation hypothesis, which posits that problematic drinking may be exacerbated by acute and chronic stress stemming from disadvantage. In addition, social drift – the view that alcohol problems lead to adverse socioeconomic repercussions – is illustrated in the model. This highlights the cyclical relationship between deprivation/poverty and alcohol use, along with its harms (Jones & Sumnall, 2016), and reflects earlier research arguing that social causation and social selection are not mutually exclusive processes (Reiss, 2013). Longitudinal research suggests that AUD is predictive of receiving social assistance, early retirement, unemployment, and reduced income, which supports the social drift hypothesis (Kendler, Ohlsson, Karriker-Jaffe, Sundquist & Sundquist, 2017). Also in favour of the social drift hypothesis, a longitudinal study found that males with AUD were more likely to migrate to (or remain in) more disadvantaged neighbourhoods whereas males with no (or remitted) alcohol problems generally experienced upwards trajectories of neighbourhood SES (Buu et al, 2007).

Although neighbourhood deprivation is associated with earlier onset of substance use (Fite, Wynn, Lochman & Wells, 2009) and greater alcohol-related harm (Beard et al, 2016), there is mixed evidence with regards to levels of consumption. Both neighbourhood disadvantage and neighbourhood affluence have been linked to higher alcohol intake, but these factors are found to operate via different pathways. A review investigating the relationship between neighbourhood SES and substance use outcomes noted that significant findings were more often reported when important individual-level mediators were absent from analyses (Karriker-Jaffe et al, 2011). Similarly, several studies show that the effects of neighbourhood deprivation on both alcohol use (Brenner, Bauermeister & Zimmerman, 2011) and mental health (Neally et al, 2022; Silva et al, 2016) become non-significant upon inclusion of individual-level socioeconomic and demographic covariates. These are important explanatory variables in the deprivation-(alcohol)harm relationship (Karriker-Jaffe et al, 2016; Slutske et al, 2016), which highlights the need to consider interactive and multiplicative effects that can further increase inequities in alcohol harms. Despite these findings suggesting indirect pathways from neighbourhood deprivation to alcohol use and related consequences, factors such as outlet

density (Slutske et al, 2016), collective efficacy (Vaeth, Caetano & Canino, 2019) and (individual-level) social cohesion (Fone et al, 2007) have failed to explain these relationships.

Longitudinal analyses suggest that the neighbourhood environments in which people live during childhood may have lasting impacts on their mental health into adolescence and adulthood (Donnelly et al, 2016; Karriker-Jaffe, Lönn, Cook, Kendler & Sundquist, 2018). Via a cascade model, Karriker-Jaffe and colleagues (2018) demonstrated that early childhood exposure to neighbourhood deprivation increases the risk of developing AUD in emerging adulthood. They suggest that this pathway from neighbourhood deprivation in childhood to development of AUD in emerging adulthood operates indirectly via lower school achievement in adolescence and worse social functioning in emerging adulthood (Karriker-Jaffe et al, 2018). In keeping with theories of a stress mechanism underlying the neighbourhood-health relationship, adolescents residing in more deprived neighbourhoods were more likely to endorse higher coping motives (i.e., drinking to relieve distress) in relation to their drinking compared to those residing in more affluent areas (Martin et al, 2019). Together, these findings strengthen claims that neighbourhood environments can constitute a chronic source of stress, particularly for disadvantaged individuals/communities (Steptoe & Feldman, 2001).

2.6. Neighbourhood features relevant to health

The primary focus of neighbourhood research is most often (area-level) socioeconomic status, with fewer studies examining the roles of built and social environments in health (Arcaya et al, 2016). However, other known contextual risk factors predictive of mental health and risk behaviours include higher population density, urbanicity, traffic and noise, pollution, poor walkability, disagreeable neighbourhood aesthetics, poor transport and services, urban light exposure, and lack of access to greenspace (Bond et al, 2012; Diez-Roux & Mair, 2010; Gruebner et al, 2017; Silva et al, 2016; Sui et al, 2022). The role of neighbourhood environments in predicting health is complex as social, demographic and physical factors at different contextual levels (e.g. neighbourhood-level, household-level, individual-level) may interact to influence health outcomes (Visser et al, 2021). For example, a higher prevalence of churches per capita has also been linked to reduced risk of mental disorder (Stockdale et al, 2007) and religious participation can be considered a component of social capital (Putnam, 2007).

Higher levels of traffic, noise and pollution create unfavourable living conditions, which promote stress and may consequently increase symptoms of mental disorder (Helbich et al,

2020; Ivey et al, 2015; Silva et al, 2016). Higher levels of (air, water and noise) pollution are typically found in urban areas (Gruebner et al, 2017), which have higher rates of psychological distress and mental disorder than rural or less dense areas (Bamford et al, 2021; Sui et al, 2022). Urbanicity may also concur with “oppressive” built environments, reflected by tall buildings, and factors that disrupt sleep patterns and thus worsen mental health (Gruebner et al, 2017). Indeed, there are robust findings demonstrating that areas with a greater hospitality industry presence have higher rates of heavy drinking (Galán et al, 2020). However, a number of large, representative studies have failed to find a link between urbanicity and mental health (Helbich et al, 2020) and there is limited evidence that urban environments may have health-protective effects (Breedvelt et al, 2022). A potential explanation is that denser, urban environments have better access to services and resources (Gruebner et al, 2017). This is notwithstanding research showing higher levels of past-year drinking (Slutske et al, 2016) and binge drinking in urban areas (Greiner, Li, Kawachi, Hunt & Ahluwalia, 2004), although other research has found the reverse relationship (i.e., rural areas having higher levels of binge drinking) (Galán et al, 2020). Similar to the AHP, rural residents are less likely to be drinkers but are more likely to binge drink (Slutske et al, 2016). When population density was controlled for, a longitudinal Welsh analysis found that residential population turnover was correlated with higher rates of psychiatric admissions, and was also a moderator of the effects of area deprivation on mental health (Handley, Oakley & Saville, 2020). There is a theoretical basis for findings demonstrating the health-damaging effects of urbanicity, which draws on evolutionary theory. Living in dense, urban places promotes misanthropy (i.e., dislike and distrust towards people) because humans are generally biased against heterogeneity and crowding – which can stimulate sensory overload, normlessness, alienation and hostility (Okulicz-Kozaryn & Valente, 2022). Urbanicity has been negatively associated with social capital (Congdon, 2010), which aligns with Putnam’s (2007) contentions that (ethnic) diversity is detrimental to NSC. However, Putnam’s argument is limited because the effects of diversity on social capital are largely reduced when important contextual variables like poverty/disadvantage are adjusted for, and which have much more damaging effects on social capital than diversity (Twigg, Taylor & Mohan, 2010). Recent evidence also documents positive associations between social capital and diversity (Mazumdar, Larnihan, Cochrane & Davey, 2018), and it is important to note that weaker ties with diverse groups constitutes “bridging” social capital (see Section 1.2.2.5.) – often conceptualised as a positive attribute that can improve tolerance of differences, enable exchange of new resources or ideas, and facilitate social control (Claridge, 2018b; Taylor, 1997).

Exposure to greenspace is consistently reported to have mental health benefits (Cohen-Cline, Turkheimer & Duncan, 2014; Dzhambov et al, 2018; Liu et al, 2020). This is demonstrated by

a twin study conducted with a large sample of same-sex adult siblings in the US, which linked lower depression with access to greenspace (Cohen-Cline et al, 2014). Qualitative evidence suggests that lay perceptions of the importance of greenspace align with these quantitative findings (O'Campo et al, 2009). Such association is thought to be underpinned by mechanisms such as: a tendency towards engaging with nature as an evolutionary adaption, as posited by the biophilia hypothesis (Barbiero & Berto, 2021; Gaekwad, Sal Moslehian, Roös, & Walker, 2022; Wilson, 1984); reduced mental fatigue when exposed to natural environments, as posited by Attention Restoration Theory (Kaplan & Kaplan, 1989; Kaplan, 1995); and increasing positive affect and reducing cortisol levels, as posited by Stress Reduction Theory (Thompson et al, 2012; Ulrich et al, 1991). Furthermore, greenspace may directly and indirectly boost social cohesion by facilitating social connection between those using the area – however, this may depend on how well the greenspace is maintained and how it is perceived by locals (e.g. whether it is safe) (Wan, Shen & Choi, 2021). Indeed, Liu et al (2020) found street-level greenness to be linked to higher neighbourhood attachment and community participation. The same study found a mediating effect of social cohesion in the relationship between greenspace and mental health, but not in the relationship between the beneficial effects of “blue space” (i.e., exposure to bodies of water, e.g. lakes) and mental health. This highlights how aspects of the physical and (perceived) social environment may interact to influence mental health-related outcomes. A study of disadvantaged Scottish neighbourhoods further supports the notion that poor aesthetic quality is detrimental to psychological wellbeing but adds that neighbourhoods that embody a sense of personal progress (i.e., makes residents feel that they are “doing well in their life”) are also important for mental health (Bond et al, 2012). The authors suggest that this understudied facet of neighbourhood perceptions is of interest because people's sense of identity and social status hinges, in part, upon the residential environments they live in – a consequence of Britain's meritocratic culture (Bond et al, 2012). However, there is some evidence that the neighbourhood physical environment is less important for depression severity than social environment (Helbich et al, 2020)

2.7. Social capital and mental health

The protective effects of social capital and social cohesion are well recognised in relation to mental health and wellbeing (Bamford et al, 2021; Baranyi et al, 2020; Berry & Welsh, 2010; Brisson et al, 2014; Congdon, 2010; De Silva, McKenzie, Harpham & Huttly, 2005; Diez-Roux & Mair, 2010; Fone et al, 2007; Fowler et al, 2013; Hamano et al, 2010; Han, 2019; Helbich et al, 2020; Gruebner et al, 2017; Kim et al, 2020a; Kim et al, 2020b; Lu & Peng, 2019; Moore et al, 2016; Secretti et al, 2019; Silva et al, 2016; Solmi, Colman, Weeks, Lewis & Kirkbride,

2017; Tamura et al, 2021), but the extent of these health benefits is still under debate and varies between studies. For example, in two different studies using UK general population samples that controlled for socioeconomic and demographic factors, one analysis found social capital to have only weak effects on psychological distress (Bamford et al, 2021) while the other suggested a more substantial impact (Congdon, 2010). Despite general agreement that social capital is beneficial for mental health, the various types and dimensions of social capital have different relationships with a range of psychological outcomes.

Low social cohesion – often conceptualised as a form of cognitive social capital – is consistently associated with increased depressive symptoms (Baranyi et al, 2020; Bertossi Urzua et al, 2019; Daoud et al, 2016; Fowler et al, 2013; Helbich et al, 2020; Ivey et al, 2015; Silva et al, 2016; Solmi et al, 2017). A recent meta-analysis covering 16 high-income countries reported individual odds ratios for depression ranging between 0.91 and 5.36 when there was a lack of social cohesion (Baranyi et al, 2020). Findings from a large Canadian study add that experiences of depression are also less severe and more short-lived at higher (rather than lower) levels of social capital (Fowler et al, 2013). However, even after separating structural and cognitive dimensions of social capital, the relationships with mental health remain complex and the mechanisms poorly understood. Both trust and sense of belonging comprise aspects of cognitive social capital, although only trust was significantly associated with lower depression in a large (N = 43,437), representative Welsh sample (Saville, 2020). Previous studies have similarly demonstrated negative correlations of trust with mental disorder and distress (Kobayashi, Suzuki, Noguchi, Kawachi & Takao, 2015; Kopacz, Ames & Koenig, 2018), while others emphasise the benefits social contacts (McAneney et al, 2015) and civic/social participation (Tamura et al, 2021). McAneney et al (2015) argue that social connections (i.e. networks and support) – typically an indicator of structural social capital – have greater explanatory value than other dimensions of social capital (e.g. neighbourliness and civic engagement) in the context of mental health. Compared to other aspects of social capital, social support has garnered much more attention in psychological research, and is often found to improve mental wellbeing (De Silva et al, 2005; Ehsan & De Silva, 2015; Whitley & McKenzie, 2005). A review that examined the roles of structural and cognitive social capital separately found there to be weaker evidence of a protective effect of structural social capital on mental health compared to the cognitive dimension (De Silva et al, 2005). In spite of mixed findings from this review, with some suggesting structural social capital may be associated with heightened distress, the majority of significant results again favoured an inverse association (i.e. “protective”) with mental illness (De Silva et al, 2005).

Findings regarding the impact of linking (i.e., “vertical”) social capital on mental health often deviate from those relating to bonding and bridging social capital. Linking social capital, operationalised as political participation, is found to be a risk factor for poor mental wellbeing (Berry & Welsh, 2010; Ding, Berry & O’Brien, 2015; Lindström & Mohseni, 2009; Lofors & Sundquist, 2007). Several large Swedish population studies highlight significant associations between linking social capital and mental health (Lindström & Mohseni, 2009; Lofors & Sundquist, 2007; Sundquist et al, 2014). One of these studies suggests that low linking social capital (political trust) is a risk factor for poor self-rated psychological health (Lindström & Mohseni, 2009), while another (N > 4.5 million) found a link with increased odds of hospitalisation for depression and psychosis (Lofors & Sundquist, 2007). However, the association with depression hospitalisation risk was attenuated to non-significance after controlling for both individual sociodemographic factors and neighbourhood deprivation (Lofors & Sundquist, 2007). Similarly, Sundquist et al (2014) report a negative association between neighbourhood linking social capital and prescriptions for psychiatric medications (antipsychotics, anxiolytics and hypnotics/sedatives) in an elderly Swedish sample. Australian longitudinal research supports these findings and demonstrates that political participation in one year is associated with poorer mental health the following year, while better mental health in one year is associated with lower subsequent political participation in the next (Ding et al, 2015). Unlike in the other Swedish studies, Chase et al (2022) found no effect of neighbourhood-level political trust on non-affective psychotic disorders in Sweden.

Social capital can be conceptualised and measured at various contextual levels, and multilevel analyses can help to distinguish compositional effects (e.g., demographic make-up of an area) from contextual effects (i.e., features of an area that operate beyond the individual-level) (see Section 1.2.2.). Multilevel analyses can also help gauge the relative impact of social capital “stored” in different types of social networks, from smaller networks of closely-bonded peers to wider networks of neighbours with whom individuals have not necessarily had direct contact with. Proximal forms of social capital (e.g. bonds with friends) are more typically associated with mental health than more distal forms of social capital (e.g. bonds with neighbours). In an analysis of older adults from Nordic countries, structural social capital with both friends and neighbours was associated with lower depression whereas this was only the case for cognitive social capital with friends – not neighbours (Forsman, Nyqvist, Schierenbeck, Gustafson & Wahlbeck, 2012). In contrast to the large body of more optimistic individual-level findings, a recent meta-analysis of longitudinal studies found no association between neighbourhood-level social cohesion and depression (Sui et al, 2022). Extant research using a multilevel approach has typically aggregated self-reported social capital perceptions to the area-level. Some studies have found an overall protective effect on mental health, above and beyond

individual-level factors (Chase et al, 2022; Hamano et al, 2010; Han, 2019; Haseda et al, 2018; Jonsson et al, 2020; Saville, 2020), while others report that the significance of ecological determinants disappears when individual-level covariates are adjusted for (Moore et al, 2016; Tamura et al, 2021). Research also highlights that some social capital proxies operate at the ecological level while others do not. For instance, neighbourhood-level generalised trust – but not sense of belonging – is found to be protective against depression (Saville, 2020). Perceived helpfulness at individual-, household-, and area-level was reported to be negatively correlated with perceived stress while other indicators of social capital (i.e., organisational participation and volunteering) only operated at the individual-level in one South Korean study (Han, 2019).

There is still much unknown about the temporal relationship between perceived neighbourhood social cohesion and mental health due to limited longitudinal data, but the groundwork to date indicates a reciprocal association (Ding et al, 2015; Saeri, Cruwys, Barlow, Stronge & Sibley, 2018; Salvatore & Grundy, 2021). However, some evidence suggests that neighbourhood cohesion predicts future mental health to approximately the same degree as mental health predicts future neighbourhood cohesion (Salvatore & Grundy, 2021), whereas other evidence suggests that social connectedness is a better predictor of mental health than the reverse relationship (Saeri et al, 2018). In contrast, Ding et al (2015) found that mental health predicts next-year informal social connectedness more strongly than vice versa, although people with worse mental wellbeing at an earlier timepoint do not benefit from structural social capital to as great an extent as those with better mental wellbeing. The bidirectional, longitudinal relationships between mental health and structural social capital indices are strongest (in both directions) for informal social connectedness and weaker for civic engagement and political participation (Ding et al, 2015). A longitudinal study of UK adolescents found that residence in a more cohesive neighbourhood predicted fewer depressive symptoms at 18 years old but not at 13 years old (Solmi et al, 2017). In another study, individuals who resided in neighbourhoods with high collective efficacy during childhood had lower levels of adolescent depression and anxiety compared to those who lived in low collective efficacy neighbourhoods, even after adjusting for neighbourhood deprivation and other socioeconomic covariates (Donnelly et al, 2016). Lu & Peng (2019) explained the effect of structural social capital on depressive symptoms via a mediating effect of cognitive social capital. Contrary to these findings, one multilevel study found both individual and aggregated measures of neighbourhood safety and cohesion were cross-sectionally (negatively) correlated with depressive symptoms, but changes in depressive symptoms over time were not associated with said neighbourhood factors (Moore et al, 2016). Length of residence is not always included as a covariate in longitudinal analyses. There are mixed findings regarding

the role of length of residence in associations between neighbourhood factors and mental health, with research on older US adults suggesting longer duration at one's address is linked to better mental health (Kim et al, 2020), while no relationship was found in a Brazilian general population sample (Secretti et al, 2019). Investigations of social capital as a determinant of mental health may be better informed by a life course perspective since individuals at specific life stages benefit differentially from the various dimensions of social capital and the different contextual levels at which they are 'stored' (e.g. family-level, area-level) (Almedom, 2005).

The relevance of social capital for (mental) health varies depending on individuals' demographic, economic and psychosocial characteristics. Taking an interdisciplinary life course perspective, a review conducted by Almedom (2005) suggests that NSC may be more important for older adults and families with children than for populations at other life stages (e.g. young adults with no children), which may be due to enhanced feelings of safety that facilitate sociability and wellbeing. This may counteract feelings of vulnerability associated with mobility issues, for example. Literature generally supports a more pertinent (protective) role of social capital and cohesion in the mental health of females, older adults and residents of highly disordered neighbourhoods (Bertossi Urzua et al, 2019; Stockdale et al, 2007), although moderation effects are not consistently reported (Henderson, Child, Moore, Moore & Kaczynski, 2016). Some research instead supports the opposite relationship – suggesting that social support can increase distress in females (Fowler et al, 2013), especially those who lack material and psychosocial resources (Riley & Eckenrode, 1986). This potentially highlights the relevance of reciprocal social relationships in social capital theory (see Section 1.2.2.). Receiving support may be stressful if it puts an individual in a position in which they perceive an obligation to return the support at some later date yet may be lacking the resources to do so. This may explain the complex moderating effect of social support in the relationship between stress exposure (i.e., neighbourhood disorder and stressful life events) and self-rated health in one study, which found the protective effects of social support to be greatest for individuals with higher stress exposure and low social support (Moskowitz, Vittinghoff & Schmidt, 2013). Another study found that higher collective efficacy predicts improvements in mental health over time, but decreases in distress symptoms are weaker for women who report worse neighbourhood problems (Brisson et al, 2014).

Studies have also found mediating or moderating effects of ethnicity (Bamford et al, 2021), functional limitations (Choi & Matz-Costa, 2018), physical activity (Kim et al, 2020), and other socioeconomic factors such as education and income (Helbich et al, 2020) in relationships between social capital/cohesion and mental health outcomes. These findings provide some evidence that enhancing social capital/cohesion can help to reduce mental health inequalities,

by protecting against the psychological harms of area-level socioeconomic deprivation (Jonsson et al, 2020). Similarly, neighbourhood social cohesion has been found to moderate the association between neighbourhood deprivation and depressive symptoms, to the extent that high cohesion almost entirely mitigated the adverse psychological effects of disadvantage on depression (Dawson et al, 2019). This is consistent with other evidence that individual-level social capital buffers the negative effects of neighbourhood deprivation on health (Verhaeghe & Tampubolon, 2012). Fone et al (2007) and Congdon (2010) observed effect modification by ecological social capital/cohesion, which was found to mitigate the adverse impact of area-level income deprivation on mental health in low-income Welsh settings and a large English general population sample, respectively. Suarez and colleagues (2022) support this with findings based on objectively measured threat response (i.e., amygdala reactivity, which is heightened when faced with stress). They found that neighbourhood collective efficacy moderated the effects of area disadvantage on threat response in their youth sample, which adds to evidence that the harms associated with neighbourhood deprivation are greater when cohesion is low.

Effects of social capital may also vary between populations with (symptoms of) common mental disorder (CMD e.g. depression, anxiety) and those with severe mental illness (SMI e.g. major depression, bipolar disorder, schizophrenia). Fujiwara and Kawachi (2008) found that cognitive social capital, but not structural social capital, was associated with reduced risk for major depression. A synthesis of qualitative studies (N=41) focusing on experiences of social capital in cases of SMI sheds light on the complex, multifaceted nature of bonding and bridging ties (defined in Section 1.2.2.5.), which can be both beneficial and detrimental to mental wellbeing (Salehi, Ehrlich, Kendall & Sav, 2019). Bonding social capital prevented loneliness, and close ties further helped to mitigate the loss of wider connections in times of social withdrawal and episodes of (mental) illness. However, “bonding social capital appeared to fluctuate depending on the course of the illness” (p.334), and individuals with SMI were unlikely to associate with others who have the same condition since this exacerbated their symptoms (Salehi et al, 2019). Experiences of bridging social capital often involved feelings of being excluded from the wider community and lack of support from healthcare professionals/services. In this study, both forms of social capital also each had positive and negative externalities, which included close ties (especially siblings) being overwhelmed with care responsibilities and being disconnected from the community themselves. These accounts may help to explain the mixed quantitative findings as they highlight “protective” effects on psychological health, sometimes at the expense of others’ wellbeing, as well as some of the negatives of social capital, particularly in situations wherein multiple parties have unfulfilled health and social needs.

Comparisons of these relationships across countries and generations reveal further complexities. For example, one Swedish study reiterates the protective effects of neighbourhood-level personal trust (aligned with bonding/'horizontal' social capital), but adds that this is only the case for individuals with native parental origins (i.e., Swedish or European) (Chase et al, 2022). Neighbourhood-level personal trust instead constitutes a risk factor for non-affective psychotic disorders in people with African or Middle Eastern parental origins (Chase et al, 2022). Meta-analytic findings show that the relationship between social cohesion and depression is stronger in countries with lower income inequality and higher air pollution (Baranyi et al, 2020). In this study, social cohesion played a strong and significant role in predicting depression in Anglo-Saxon countries but not in Southern European countries (Baranyi et al, 2020). Bertossi Urzua et al (2019) found that, in a large sample of older Central/Eastern European adults (N = 15,438), low social cohesion was associated with increased depressive symptoms and this effect was more pronounced in men than in women. The relationship between social cohesion and depressive symptoms was not explained by alcohol use. Together, these findings reinforce the importance of multilevel analyses to account for clustering within areas – whether at the local level (i.e., neighbourhoods) and/or beyond (e.g. county-level, national-level) – since there is an important body of literature that demonstrates cross-country differences in how social capital influences mental health.

2.8. Social capital and alcohol use

With regards to alcohol (and other substance) use, the picture is less clear. Both positive and negative associations with social capital have been reported in previous research, with some studies suggesting that the direction of the relationship depends on the selection of proxy indicators and the level at which they are measured. Other studies have failed to find any significant influence of social capital or cohesion on alcohol use and related outcomes (de Gelder et al, 2017; Echeverría et al, 2008; Fagan et al, 2015; Nie et al, 2018; Tofani, Lamarca, Sheiham & Vettore, 2015). Systematic reviews examining the relationships between neighbourhood social environments and alcohol use in adults and/or adolescents have generally returned mixed or inconclusive findings, and highlight a dearth of longitudinal and multilevel analyses (Bryden et al, 2013; Jackson, Denny & Ameratunga, 2014; Breedvelt et al, 2022).

A review of 48 studies by Bryden and colleagues (2013) found there to be protective effects of NSC, closeness, attachment and supportiveness on alcohol use, while reporting mixed or inconclusive results for community social norms, deprivation, disorder and other

socioeconomic factors. Overall, findings indicate that higher levels of social capital are associated with lower alcohol use and, in adolescents, there was some evidence that social disorder and tolerability of drinking are associated with lower alcohol use. Another review of multilevel studies investigating the effects of neighbourhood social environments on adolescent alcohol use reported conflicting findings to Bryden et al (2013), with results suggesting that, despite there being potential protective effects of some components of social capital on (youth) drinking behaviours, there is a lack of evidence that these benefits extend to the neighbourhood level (Jackson et al, 2014). The results were mostly mixed in relation to neighbourhood norms and attitudes to alcohol use, as well as for levels of consumption (at the neighbourhood level) and NSC. In this review, collective efficacy was not found to be associated with alcohol use.

Protective effects of social capital have been reported in relation to alcohol-related harms such as binge drinking/heavy episodic drinking (Villalonga-Olives, Almansa, Shaya & Kawachi, 2020), adolescent alcohol use (Wray-Lake et al, 2012), solitary drinking (Perez et al, 2022), and AUD symptoms (Tsai, Foster, Gmel & Mohler-Kuo, 2020). Higher levels of neighbourhood social cohesion – an indicator of cognitive social capital – have further been linked to protection from drinking harms perpetuated by others (Tam et al, 2021; Weitzman & Chen, 2005). With regards to specific social capital indicators, low perceived social support has been linked to problem drinking (Galán et al, 2020), and symptoms of dependence (Bravo, Kelley & Hollis, 2016). Improvements in social support over time are associated with reductions in dependence symptoms and related problems (Bravo et al, 2016). The association between (alcohol-)drinking variables and trust is unclear as some studies report positive relationships (Seid, Hesse & Bloomfield, 2016) while others report negative relationships (Kim et al, 2020). Other research points to a “dark side” of social capital that promotes drinking patterns conducive to further harms (Chuang & Chuang, 2008; Kuipers et al, 2012; Kuipers et al, 2013; Lindström, 2005a; Martins et al, 2017; Nie et al, 2018; Seid et al, 2016; Villalonga-Olives & Kawachi, 2017; Yang et al, 2020). Yang et al (2020) found that, although social capital was inversely associated with most health behaviours (e.g. smoking, poor diet, lack of physical activity), this was not the case for alcohol use, which was positively related to social capital in their study. This may be because alcohol use was operationalised as drinking at least once per week and the study was conducted in China, where alcohol is customarily used in social situations. Several large, general population studies report that neighbourhood social cohesion is associated with higher odds of binge drinking (Kim et al, 2020; Kuipers et al, 2012; Kuipers et al, 2013).

Evidence that negative social support (i.e. criticism or too many demands from relationships) is a risk factor for binge drinking in both males and females (Villalonga-Olives et al, 2020) also aligns with findings reported in Section 2.7. regarding the mental health “risks” of higher social capital, particularly amongst disadvantaged women. Indicators of structural social capital are even more commonly reported as drivers of alcohol use than cognitive forms. For example, civic engagement has been associated with higher rates of heavy drinking (Murphy et al, 2014; Nie et al, 2018). Social participation, which is typically operationalised as membership in organisations, is associated with harmful drinking (Nie et al, 2018), risky single occasion drinking (Seid et al, 2016), frequent drinking (Chuang & Chuang, 2008), consumption of illegal (i.e. homemade/smuggled) alcohol (Lindström et al, 2005b), and drinking above recommended limits (Lindström et al, 2005a). However, the many different alcohol outcomes investigated in these studies impedes meaningful comparison of findings. Socialising with male friends in particular may promote risky drinking, while the opposite trend is found for contact with male family members (Seid et al, 2016). This further complicates understandings of how social capital influences health since these results suggest that other mechanisms are at play besides gender differences and proximity of social connections (i.e., whether social capital is embedded in the immediate environment, such as friends and family, versus more distal environments, such as neighbourhoods and counties).

Given the complex nature of the relationship between neighbourhood social environments and alcohol use behaviours, notions of “protective” and risk-inducing properties of social capital are being increasingly challenged, with some scholars advocating for a more nuanced approach to examining the social mechanisms underlying drinking behaviours (Tucker, Pollard & Green, 2021; Villalonga-Olives et al, 2020). Recent research suggests that social capital may promote drinking while paradoxically preventing drinking harms. This may reflect a non-linear relationship between social capital and alcohol consumption, since moderate (rather than low or high) social cohesion is linked to risky drinking (Kuipers et al, 2012). Lin, Witten, Casswell and You (2012) suggest that neighbourhood social cohesion is positively associated with alcohol use frequency but at low quantities. In a similar vein, Tucker et al (2021) found higher neighbourhood order (i.e., low crime/violence) and network density to be associated with increased probability of being a binge drinker, yet a lower frequency of binge drinking. The authors of the latter study theorise that heightened perceptions of safety and social drinking opportunities (afforded by high levels of order and dense networks) might make binge drinking more likely; but that these same neighbourhood social factors might then prevent higher *frequencies* of binge drinking. A recent longitudinal analysis that followed adolescents into early adulthood provides insight into this particular complexity (Perez et al, 2022). Perez and colleagues (2022) found that both increasing and decreasing levels of cohesion were

advantageous over stable cohesion trajectories with regards to alcohol-related consequences (e.g. regrettable actions or situations, getting into trouble, forgetting things). However, this pattern of reduced drinking harms amidst decreasing cohesion may be exclusive to this life stage as the authors speculate that this pattern reflects the shifting neighbourhood social dynamics as “youth transition to new adult roles” (p.6). Further longitudinal research is needed to confirm whether this trend is generalisable to other age groups.

A large proportion of studies focus on how social capital influences risk behaviours and/or mental health in adolescent and student populations (e.g. Martins et al 2017; Takakura et al, 2019; Weitzman & Chen, 2005). There is contrasting evidence regarding the relative importance of neighbourhood-level social factors in adolescent samples. In one Japanese study, school-level collective efficacy (CE) was found to exert greater influence over adolescent alcohol use than neighbourhood-level CE (Takakura et al, 2019); whereas, in a Brazilian study, adolescent binge drinking was more sensitive to changes in neighbourhood social cohesion rather than social cohesion at school (Martins et al, 2017). In addition to these conflicting findings, there is also disagreement regarding whether social capital and related constructs exert a protective or detrimental effect on youth alcohol use. The latter longitudinal study found that a self-reported increase in neighbourhood social cohesion predicted higher levels of future binge drinking (Martins et al, 2017), which reflects the “dark side” of social cohesion that is also documented in adult samples described above. Adolescents living in more cohesive neighbourhoods are found to have lower engagement in substance use behaviours (Pei, Wang, Wu, McCarthy & Wu, 2020), which is theorised to result from greater informal social control (e.g. disapproval or intervention from neighbours) in the local area (Section 1.2.). Social cohesion in one study of adolescents only operated indirectly via depression and peer substance use (Pei et al, 2020). Depression, however, did not play a significant role in the relationship between social cohesion and adolescent alcohol use specifically (Pei et al, 2020). Interactions between neighbourhood social factors, age and gender have also been reported by other studies suggesting that effects of social capital on health are stronger for older (compared to younger) people (Muckenhuber, Stronegger & Freidl, 2013), and that social capital embodied in neighbour relations are stronger for young females while family and peer social capital is more relevant to the risk behaviours of young males (Magson, Craven, Munns & Yeung, 2016).

Multilevel studies of neighbourhood effects on drinking patterns have also returned conflicting results. Some research has shown that composite (neighbourhood-level) social capital (De Silva et al, 2005) and aggregate measures of civic engagement (Murphy et al, 2014) and social participation (Chuang & Chuang, 2008) are positively associated with problem drinking.

Contrasting research suggests negative correlations between neighbourhood-level social support and heavy episodic drinking (Seid et al, 2016). Several papers report no independent effect of ecological social capital/cohesion on alcohol use variables such as harmful drinking (Nie et al, 2018), quantity and frequency measures (Lin et al, 2012), consuming alcohol whilst pregnant (Tofani et al, 2015), and adolescent drinking motives (Martin et al, 2019). Area sociodemographic composition is a likely factor influencing how social capital operates in relation to alcohol use, which is demonstrated by a large, cross-sectional study (n = 17,352; Paljärvi, Suominen, Koskenvuo, Winter & Kauhanen, 2009). They reported lower odds of drunkenness, hangovers and pass-outs with higher levels of social engagement and trust but only within a (Finnish-speaking) majority population; yet, in a (Swedish-speaking) minority population, a lack of significant associations between drinking behaviours/harms and social characteristics was found (Paljärvi et al, 2009). Although social capital variables were measured at the individual level in this study, findings point to complexities in the hypothesised “ethnic density effect” – the (theorised) phenomenon that, for individuals from an ethnic minority background, living in areas characterised by a higher geographic concentration of co-ethnic residents may reduce the risks of mental health and/or substance use problems (Bécares, Nazroo & Stafford, 2011).

Research suggests that psychosocial and demographic factors may mediate and/or moderate effects of neighbourhood environments on drinking behaviours. The impact of neighbourhood social settings (i.e., social participation and social cohesion) on the mental health of older adults was mediated by loneliness in one study, which further added that this effect was more salient for emotional (rather than social) loneliness (Domenech-Abella et al, 2021). Despite being conceptually similar to social cohesion, collective efficacy did not mediate the relationship between area disadvantage and drinking outcomes in a sample of Puerto Rican adults (Vaeth et al, 2019), although it did mediate the effects of neighbourhood disadvantage on binge drinking and high-quantity consumption in a separate study of adolescents (Jackson et al, 2016). The latter study found that collective efficacy (and social cohesion as a standalone measure) was also a risk factor for high-quantity alcohol consumption in older adolescents (aged 16+) but a protective factor for younger adolescents (Jackson et al, 2016). Low collective efficacy is also reported to strengthen the (positive) relationship between neighbourhood-level alcohol outlets/sales and underage drinking (Maimon & Browning, 2012). Neighbourhood closeness interacted with gender in relation to drinking among Taiwanese adults – again supporting a stronger effect for females (Chuang & Chuang, 2008). In explaining the differential effects of neighbourhood deprivation and affluence, Karriker-Jaffe et al (2016) found that area deprivation directly promoted negative alcohol-related

consequences, whereas pro-drinking attitudes and heavier consumption patterns mediated the effects of affluence.

Qualitative studies provide further insight into the differential effects of social interactions and other environmental components on drinking behaviours. Neale and Brown (2016) reveal distinct differences in types of friendships among homeless people who use alcohol, suggesting that family-like friends may be less likely to use alcohol (or drugs) problematically but were in regular contact (including occasional drinking) with participants, whereas other homeless friends would provide emotional and tangible support in the form of money, other material resources and/or encouragement to tackle substance use problems. Based on a sample of young adults in England, one study describes how alcohol use is instrumental in accruing social capital and reducing the risk of isolation (MacArthur, Jacob, Pound, Hickman & Campbell, 2017). The qualitative analysis of how drinking is shaped by peer influences is framed according to Bourdieu's conceptualisation of social capital (i.e. an individual-level asset), and highlights the influence that cultural norms, such as "pre-loading", have on drinking behaviour (MacArthur et al, 2017). Involvement of alcohol in fulfilling gender roles is also reported (Dumbili, 2015; Atkinson, Meadows, Emslie, Lyons & Sumnall, 2022; Atkinson & Sumnall, 2016), which may help to explain differential drinking patterns and motives between males and females. While males have been reported to drink for reasons such as to improve sexual success, social status and boast masculinity, females more often drink for hedonic pleasure and sociability (Dumbili, 2015).

2.9. Methodological issues associated with neighbourhood research

Despite an exponential increase in articles focusing on neighbourhood determinants of health since the mid-2000s (Arcaya et al, 2016; Riva et al, 2007), there are several methodological issues that are endemic in neighbourhood research. These include problems associated with aggregated data, definitions of context, self-report, attrition rates, and (lack of) longitudinal designs.

Multilevel studies typically rely on aggregated individual responses to questions on perceived neighbourhood social conditions but this can give rise to an ecological fallacy in interpretation (Freedman, 2001; Merlo, Chaix, Yang, Lynch & Råstam, 2005). This refers to the tendency to inaccurately attribute group-level findings to individuals within the group, thereby misinterpreting potential causal processes occurring at the individual- and contextual-level. For example, the role of neighbourhood social cohesion in the association between area-level

ethnic density and individual-level mental health may operate differently for various demographic groups within the area (Hong, Zhang & Walton, 2014). The authors of a review on the association between alcohol retail outlet density and alcohol-related outcomes concluded by warning against studies that use aggregated measures of outlet density due to the potential for ecological fallacies, and instead advocated for more nuanced examinations of neighbourhood determinants of alcohol use that appreciate variations in outlet type (e.g. on- vs. off-license; restaurants vs. clubs) (Gmel et al, 2016). In a similar vein, Simpson's paradox occurs when a trend observed in multiple different groups disappears or reverses when the data are combined (Kievit, Frankenhuys, Waldorp & Borsboom, 2013). These issues with aggregation highlight the importance of stringent, theory-driven model specification, which controls for relevant individual- and contextual-level covariates. Aggregation also increases the risk of measurement error. In other words, it is difficult to ascertain what effects occur at the individual-level and what separate effects occur at the area-level because respondents are grouped typically based on (often arbitrary) geographic units, and any measurement error that is not systematically studied at the individual-level is carried over to confound estimation of area-level (i.e. aggregate) effects.

Other potential challenges include the modifiable areal unit problem (MAUP) and the uncertain geographic context problem (UGCP). The MAUP results from aggregated data and is a problem associated with the use of scaling and zoning systems (Fotheringham & Wong, 1991) that lends itself to ecological fallacy (Freedman, 2001). Essentially, contextual units used to denote "neighbourhoods" – such as census tracts, postal codes, block groups, and other administrative boundaries – are arbitrary because they are subject to change at any point by administrators. As such, analyses of a given area that differ only in their selection of spatial units can produce vastly different results. Oberndorfer et al (2022) demonstrate how an intraclass correlation coefficient (ICC; a statistic with values between zero and one that indicates the extent of within-cluster relatedness) of zero or one can be obtained from the same data, simply by redefining context. Similar to, but distinct from the MAUP, the UGCP refers to how true area-based effects might be obscured by chosen geographic units for analysis of contextual influences on health outcomes (Kwan, 2012). The UGCP has two dimensions: spatial (uncertainty regarding which geographic units actually influence health) and temporal (uncertainty regarding "the timing and duration to which individuals are actually exposed to these contextual influences" (p. 959, Kwan, 2012). The spatial dimension of the UGCP is not analogous to the MAUP as it alludes to a more nuanced issue, which is that it is, so far, unfeasible to separate geographic spaces from the social contexts that operate within and across them (Kwan, 2012). A methodological review of 256 multilevel studies found that only 3.1% and 0.8% of the articles acknowledged the MAUP and UGCP, respectively (Arcaya

et al, 2016). Similarly, it is rarely recognised that neighbourhood environments change over time via processes such as gentrification.

Another key limitation of neighbourhood research is that it relies heavily on self-report measures to determine the social conditions of an area. Echoing concerns about defining context, it is important to note that residents' perceptions of neighbourhood boundaries do not always align with formal municipal borders (Coulton, Korbin, Chan & Su, 2001) and definitions of "neighbourhood" are inconsistent across the literature (Park et al, 2016). Most existing studies use Likert scales or similar quantitative tools to gauge neighbourhood ratings but there is little effort to ensure that survey items are interpreted similarly by participants. Although this is the case for almost all instances of self-report, it is particularly pertinent in neighbourhood research considering the conceptual issues outlined in Section 1.2.2.3. For example, neighbours that check in on one another and regularly stop to talk may be a critical source of social support for one individual but a burden or violation of privacy to another. In this case, self-reported neighbourhood ratings do little to help elucidate the mechanisms through which social capital operates, particularly since these studies are rarely underpinned by a theoretical framework. More general issues such as social desirability bias and under-reporting of stigmatised experiences (e.g. of mental illness or risk behaviours) that are universally applicable to self-report data should also be acknowledged in the context of neighbourhood research.

Model misspecification can occur when neighbourhood ratings and health outcomes are self-reported by the same individuals. This is referred to as "same-source bias" (Chum et al, 2019; Diez-Roux & Mair, 2010). For example, individuals with depression tend to have negative cognitive biases, which may extend to perceptions of their neighbourhood environments. Thus, it is unclear whether reported associations between neighbourhood social factors and mental health reflect true, causal links (e.g. low social cohesion predicts depression) or, rather, compositional artifacts (e.g. they are spurious associations reflecting the tendency for individuals with depression to perceive their environments more negatively than their neighbours without depression). In a study examining same-source bias in neighbourhood research on mental health, significant associations between individually-rated neighbourhood exposures (neighbourhood problems, safety, service quality, and linking social capital) and depression ceased to be significant when the same exposures were aggregated to the neighbourhood-level (Chum et al, 2019). To overcome this issue, some studies have used objective measures of neighbourhood conditions, such as geographic information systems (GIS) (McLafferty, 2015; Moore et al, 2016; Park et al, 2021), or used independent raters and multiple data sources to assess the environment (Bertotti et al, 2013; Raudenbush &

Sampson, 1999). Recent reviews of neighbourhood effects on health (behaviours) highlight the need for longitudinal studies to address the issue of causation. A large review conducted by Arcaya et al (2016) found that less than one in five (multilevel) studies on neighbourhood effects had a longitudinal design.

An alternative method is the “key informant technique” (Marshall, 1996). This is a strategy often used in ethnographic research that involves consulting an “expert” source for information about neighbourhood environments, and it may have advantages over averaging individual ratings to create a contextual variable. Other studies have similarly drawn community ratings from a separate source to those providing data on their health and/or health behaviours, which allows for a greater number of observations of neighbourhood factors compared to the key informant approach. These methods avoid the issue of measurement error associated with aggregate scoring and it also prevents results from being obscured by same-source bias. There are still issues with this approach, such as the biases held by the key informant(s) which may not represent the neighbourhood residents’ views/interests as a whole, disparities in social status between residents and the informant(s), as well as the dynamics that occur between key informant(s) and the research team, which can be quite different to those between passive participants and researchers (Marshall, 1996). Adopting the key informant technique in a multilevel, cross-sectional study of the effect of NSC on health, Lagaert et al (2021) suggest that individual-level social capital is more important for self-rated health than neighbourhood-level social capital, and that contextual effects are only weak.

2.10. Chapter summary

This section provided a theoretical overview of important neighbourhood social concepts and summarised literature on the social capital as a potential determinant of mental health and alcohol use. Prior neighbourhood research has mostly focused on the role of disadvantage in predicting health outcomes, with relatively little attention paid to the social contexts in which health behaviours occur. However, recent years have seen a substantial increase in studies examining NSC as a predictor of health, particularly as evidence of variation in health outcomes at a contextual-level (rather than individual-level) has emerged. Socioeconomic deprivation at the individual- and neighbourhood-level has adverse implications for wellbeing and constitutes a barrier to social capital formation. Although there is general consensus that social capital is beneficial for mental health, studies on drinking behaviours are often mixed and inconclusive. Recent studies suggest that this may be because there is a non-linear association between social capital and alcohol-related outcomes, whereby moderate levels of

social capital confer lower risks of drinking harms than high or low levels. These investigations have helped to explain tensions between one portion of social capital research advocating for “protective” effects and another warning of the “dark side”. Inconsistent operationalisation of social capital further complicates matters by impeding comparison of findings and thwarting efforts to establish the mechanisms underlying these associations. Extant literature shows that cognitive and structural dimensions of social capital may operate via different pathways to affect alcohol use. From a network (rather than cohesion/socio-structural) perspective, bonding, bridging, and linking forms of social capital may also have unique influences on drinking. Strong associations exist between mental health and alcohol use, but it is unclear if and how perceived neighbourhood social environments impact these relationships. Limitations of previous research include the lack of longitudinal and multilevel analyses. Longitudinal studies are needed to better understand the direction of associations while multilevel studies can help to separate individual- from neighbourhood-level effects. Research that incorporates longitudinal and multilevel designs can better enable an understanding of the pathways from neighbourhood social contexts to drinking behaviours. This knowledge is key to addressing health inequities and developing effective place-based interventions or policies that tackle alcohol-related harms and promote sustainable communities.

CHAPTER 3: Methodology

3.1. Research design and paradigm

The current work takes a mixed methods approach to investigating the research questions specified in Section 1.4. A crucial aspect of mixed methods research is integration of findings, which refers to “the bringing together of quantitative and qualitative components of a study” or “the “mixing” in a mixed methods study” (p.630, Doyle, Brady & Byrne, 2016). The definitions, approaches and acceptability of mixed methods research are contentious, as there is debate regarding the extent and manner of integrating qualitative and quantitative methods. The term “mixed methods” is sometimes used synonymously with “multimethods”, however some scholars argue that they have distinctly different meanings and implications for the research outputs (Anguera, Blanco-Villaseñor, Losada, Sánchez-Algarra & Onwuegbuzie, 2018). Implementing a “multimethod” approach does not necessarily call for integration of the quantitative and qualitative components, particularly if these components are used to address separate research objectives (Plano Clark & Ivankova, 2016). Unlike “mixed methods”, a “multimethod” approach can also refer to purist methodologies (e.g. either qualitative or quantitative), for example, in a wholly qualitative work package that collects observational and interview data. The term “mixed methods” will be used throughout the current work package to refer to the overall approach to the thesis, as it necessitates the use of both qualitative and quantitative methods, as well as integration of findings to provide a more holistic account of the data.

Mixed methods approaches have drawn criticism from “methodological conformists” who argue that quantitative and qualitative epistemologies are incompatible with each other since the former assumes an objective and measurable reality whereas the latter assumes that realities are subjective and unique to individuals’ own experiences (Hafsa, 2019). A pragmatic worldview overcomes these issues with mixed methods research but should not be used as a pretext for “short-sighted practicalism” (Cameron, 2011), i.e., using convenient practical solutions to achieve study outcomes without adequate regard for the theory behind the research question(s). Teddlie & Tashakkori (2010) advise mixed methods researchers to position themselves according to an a-paradigmatic stance, substantive theory stance, or multiple paradigms stance. The current work is most aligned with the substantive theory stance, in which “paradigms may well be embedded in or intertwined with substantive theories” but “what matters most in guiding practical inquiry decisions are the substantive issues and

conceptual theories relevant to the study” (Greene, 2007, p.69) rather than epistemology. This thesis is therefore guided primarily by social capital theory (see Section 1.2.2.) and other concepts relevant to neighbourhood social environments, and its value is not undermined by the bringing together of data traditionally analysed from a positivist standpoint (i.e., study 2) versus a constructivist/interpretivist standpoint (i.e., study 3). As exemplified by Greene (2007), the thesis is predominantly “about concepts, patterns, predictions, not about the nature of knowledge or the social world” (p.76). Similarly, the weighting of quantitative and qualitative aspects of this work is somewhat trivial given that the findings from each strand will be interpreted both together and separately to develop and refine a novel conceptual framework (i.e., study 1) for guiding future inquiry.

These considerations regarding paradigm compatibility and pragmatism are encompassed in the Five Ps framework proposed by Cameron (2011), which aims to guide researchers through the challenges of mixed methods research. The remaining three tenets of the framework include “praxis”, “proficiency”, and “publishing”. Firstly, the guidance on praxis mandates that the research question(s) informs the methods and that the investigator must be clear regarding any remaining gaps in the knowledge. Secondly, it is essential that the researcher is competent to collect and analyse both qualitative and quantitative data (i.e., proficiency). Doctoral students may have limited experience in conducting both types of research; however, for the current work, the supervisory team have the necessary expertise to advise on triangulation. Finally, when publishing, one must be conscious of word count constraints and acceptability of mixed methods approaches in the field, so innovative reporting styles and dissemination methods should be considered.

3.2. Overview of the current approach to mixed methods research

A three-stage, sequential design, underpinned by a pragmatic and transformative paradigm (described in further detail in Section 3.2.2.) was implemented. This work comprises both exploratory and explanatory components, which will be synthesised through the lens of social capital theory to produce a theory-driven, evidence-based understanding of neighbourhood factors influencing drinking behaviours. Prior neighbourhood and health research using a mixed methods design has similarly incorporated both exploratory and explanatory aspects rather than taking an either/or approach (Eastwood, Jalaludin & Kemp, 2014). This approach is suited to multistage research projects with a duration of three or more years, where exploratory components may be used to identify phenomena, understand the phenomena from the perspective of stakeholders, and develop hypotheses, while explanatory components

may be used to test a framework or confirm theorised causal mechanisms (Eastwood et al, 2014).

For the programme of work presented in this thesis, a preliminary review of theory and relevant empirical evidence was used to inform the development of a framework that illustrates the hypothesised mechanisms underlying the relationship between neighbourhood social environments and alcohol use behaviours (i.e., Study 1). The findings from this initial exploratory inquiry were used to specify the variables of interest, hypothesised temporal relationships, and interpretation of findings in the subsequent quantitative study (i.e., Study 2). Insight from Study 2 was then used to help to determine an appropriate sampling frame for the qualitative study (i.e., Study 3), while both Study 1 and Study 2 informed the topic guide content and participatory task for Study 3. Synthesis of both qualitative (i.e., interview transcripts) and quantitative (i.e., questionnaire) data from Study 3 helped to elaborate on the findings from Study 2. With regards to the “mixing” element of the full mixed methods research study, using a selection of the same questionnaire items used in the Understanding Society dataset to survey Study 3 participants allowed for better comparison and integration of findings, although no quantitative analysis was conducted due to the small sample size recruited for the qualitative study. Participant profiles were compared against the latent classes identified in Study 2 and the themes extracted from interview transcripts were used to help to explain why and how neighbourhood social factors are associated with alcohol use. In this sense, the qualitative study uses an explanatory design to better understand the patterns identified in Study 2 and to elucidate any ambiguities in the Study 1 framework. However, the flexibility of semi-structured interviews embedded in the participatory approach in Study 3 allowed for exploration of concepts that may not be addressed in the former studies – if participants perceive certain neighbourhood socio-structural issues to be of a higher priority. Together, statistical evidence from Study 2 and rich, qualitative data from Study 3 helped to address any inconsistencies, ambiguities, or gaps in knowledge present in the Study 1 framework. The overall findings from this work helped to shed light on the mechanisms underpinning the neighbourhood-health relationship, and drew upon on existing theory, empirical quantitative evidence, and lay perceptions. Data from each study was analysed separately before being brought together (i.e. triangulation; see Section 3.6. and Chapter 7) to corroborate the individual studies’ findings.

3.2.1. Pragmatism

A pragmatic approach is arguably well-suited to the integration of quantitative and qualitative data because the focus is on “what works” rather than epistemology (Doyle, Brady & Byrne, 2009). Pragmatism has been criticised for prioritising convenience over ensuring that the research achieves valid findings with coherent ontological and epistemological considerations (Hampson & McKinley, 2023). However, some scholars contend that pragmatism is useful for choosing the best methods to address the research questions and that conforming to a single epistemological standpoint is not necessary to do this (Johnson & Onwuegbuzie, 2004). The use of mixed methods challenges the contended subjectivity versus objectivity dichotomy by recognising that emotional and personal experiences (i.e., subjective) are not separable from scientific “facts” about reality. Cameron (2011) refers to pragmatism as the “bridge between paradigm and methodology”. In this sense, methodology is not constrained to what is aligned with a particular philosophical view, and instead is afforded greater flexibility that allows the researcher to choose the best methods for addressing the research aims. Pragmatists understand “truth” to be determined by what is useful in reality, for solving practical problems (Biesta, 201). Reality itself is viewed as being socially constructed and is not necessarily limited to the bounds of metaphysical realism. In other words, truths are malleable; as reality changes over time and context, so does what is true about the world. As such, pragmatists recognise that findings must be interpreted with consideration of socio-political and historical contexts (Hafsa, 2019). Given that (hazardous) alcohol use constitutes a significant public health burden and the socio-spatial distribution of related harms represent wider health inequalities, pragmatism is an appropriate framework within which to carry out this research and to further efforts to solve real-world problems (i.e., drinking harms, social and health inequities). To successfully implement a pragmatic approach, the researcher must repeatedly revisit both inductive and deductive – subjective and objective – styles of reasoning, so to uphold methodological rigour but also ensure that the resulting knowledge and implications have practical value.

3.2.2. Transformative worldview

A transformative approach complements the overarching pragmatic paradigm adopted for this thesis as the intended outcome is to gain a more comprehensive understanding of neighbourhood effects on (psychological and behavioural) health with a view to support grassroots action and stimulate broader socio-political change. The rationale for this blend of

pragmatism and transformative principles is that, without involving community (lay) members in the research process to gauge their personal perceptions and experiences of neighbourhood environments, the pragmatic premise of deriving practical solutions is effectively violated should these solutions not be acceptable to the affected communities. With regards to the pragmatic concept of “truth”, it would be inherently wrong to draw conclusions about perceived neighbourhood (social) environments that do not acknowledge “the place-bound, experiential knowledge of local actors” (p. 367, Henke & Gieryn, 2008). The explicit focus of socioecological models (described in Section 1.1.6.) on contextual and interactive influences calls for collaboratively generated knowledge with input from both researchers and local actors, as a means to support the validity and utility of the research (Richard et al, 2011). A central tenet of transformative research is not only to represent and empower the local actors, but to actively work towards social justice. It is hoped that the anticipated involvement of both relevant stakeholders and Merseyside residents at a photovoice exhibition will help to inform policymakers of local concerns and further support improvements in bridging and linking social capital.

3.3. Rationale for review and theory synthesis (Study 1)

Collation and qualitative synthesis of relevant theory can offer richer understandings of the social gradient of alcohol use patterns and provide a layer of interpretation to construct a conceptual framework that will inform future investigation into this topic. A good portion of the relevant literature also lacks a solid theoretical basis for the methodology and *a priori* considerations (Pickett & Pearl, 2001), so compiling both theory and empirical evidence from various disciplines will allow for more holistic inquiry into the association between neighbourhood social environments and alcohol use, and help facilitate efforts aimed at establishing causation (which is the aim of Study 2 in this thesis). Longitudinal investigations of these relationships, such as those within a structural equation modelling framework, require a strong theoretical basis and are supported by a visual model that clearly depicts the extent to which the model fits the data, as well as the residual error that is unaccounted for (Grimm, Ram & Estabrook, 2017). Hence, there is a need to develop a testable conceptual model strongly grounded in theory.

The theory synthesis approach taken in the current study is advantageous because the hypothesised pathways will be visually represented by the framework and can be used as a tool in preparation for longitudinal analysis of salient linkages in a large, representative UK dataset to test aspects of the conceptual model (i.e., study 2). The framework derived from

qualitative theory synthesis will be supported with empirical, quantitative findings. This reduces the risk of bias stemming from subjectively reformulating work on “what” associations may exist between the factors of interest, while allowing for creative insight into “how” and “why” neighbourhood social environments affect drinking. Subsequent studies in the thesis were guided by the conceptual framework, but their findings may also lead to further revisions should the results offer a more nuanced understanding of the social mechanisms involved in drinking behaviour.

3.4. Rationale for latent class growth analysis (Study 2)

Works by Jellinek (1960), Cloninger and colleagues (1981), and Babor and colleagues (1992) offer some of the earliest, most influential alcohol use typologies developed via empirical study. For example, the type 1/type 2 classification of “alcoholism” differentiates pathological drinkers based on genetic risk, age of onset, drinking severity, gender, and criminality (Cloninger, 1981). Type 1 alcoholism can affect both males and females and is characterised by typical onset during adulthood, a lesser hereditary component, and is milder than type 2 alcoholism, which mostly affects men and is characterised by onset during adolescence, severe dependence, probable family history of alcohol problems, and high novelty-seeking and/or criminality. Babor’s (1992) type A/type B typology categorises pathological drinkers based on similar criteria, whereas Jellinek (1960) developed a 5-cluster model reflecting stages of disease progression. Alcohol use typologies can be used to guide diagnosis (e.g. mild, moderate, and severe AUD), to help researchers and clinicians understand variability in drinker phenotypes, to help determine what interventions or treatments are best suited to different groups, and to identify high-risk groups and develop public health strategies to reduce alcohol-related harms (Babor & Caetano, 2006).

Recent research is increasingly adopting advanced statistical methods to uncover nuanced subgroups of drinkers, determine how their drinking patterns and/or related consequences change over time, and test predictors of their group membership and associated trajectories. These methods typically employ techniques belonging to broader “families” of approaches, such as cluster analysis, growth mixture modelling (GMM), finite mixture modelling (FMM), and structural equation modelling (SEM). Much prior literature has taken a variable-centred approach (e.g. regression analyses) to understand neighbourhood influences on mental health and risk behaviours (Jackson et al, 2014; Pickett & Pearl, 2001). Traditional, variable-centred approaches test associations between factors and estimate a single set of parameters for a given population, thus offering parsimonious explanations for the observed

trends. However, more holistic understandings of health behaviours can be obtained from person-centred approaches. These approaches forgo the homogeneity assumption and instead allow unobserved subgroups (known as “latent classes”, LCs) within the sample to be categorised based on some particular variable(s) (e.g. drinking behaviours and/or consequences), and the probability of LC membership to be estimated in association with covariates (Jung & Wickrama, 2008). In this sense, LC approaches are suited to examining *patterns* of alcohol use (Berlin, Parra & Williams, 2014) thereby enabling analysis of complex (and, in some cases, longitudinal) information in the form of drinker prototypes. This deviates from more commonly used classification techniques in this area, such as categorising individuals as hazardous, harmful, and dependent drinkers (see Section 1.1.2. for further explanation). While this approach to classification is useful for identifying groups of people at different levels of risk and determining appropriate interventions, these groups are heterogeneous with regards to their sociodemographic characteristics and other distal factors (McManus et al, 2016). These categories are also based on cross-sectional data so they cannot indicate how people’s alcohol consumption changes over time and what factors are predictive of change. Using longitudinal, person-centred approaches to develop novel typologies of drinking may help to inform interventions that can be better tailored to the psychosocial and treatment needs of specific populations revealed by LCs. Previous research has used person-centred approaches to understand heterogeneity in neighbourhood environments (Lekkas, Stankov, Daniel & Paquet, 2019) as well as subtypes of AUD in the general population (Müller et al, 2020). However, it is unclear whether neighbourhood factors predict patterns of risk behaviours such as alcohol use.

Latent class analysis (LCA) is one example of FMM that has been increasingly adopted in the substance use field to uncover more nuanced insights into the variability of drinking behaviours and drinker profiles. Previous uses of LCA to describe groups of individuals with alcohol use disorder (AUD) vary in their sample characteristics and choice of indicators (to determine LCs). Some studies base LCs purely on consumption levels, AUD symptoms and/or AUD diagnostic criteria (Beseler, Taylor, Kraemer & Leeman, 2012; Szabó, Towers, Sheridan & Newcombe, 2021), while others include measures such as alcohol-related consequences, age of onset, comorbid mental health problems or drinking motives (Casey, Adamson & Stringer, 2013; Davoren, Dahly, Shiely & Perry, 2018; Lardier et al, 2022; Moss, Chen & Yi, 2007; Müller et al, 2020). Research comparing the utility of different statistical approaches has found that LCA has greater explanatory value in relation to variability in alcohol dependence than other approaches such as factor analysis (Kuo et al, 2008). Latent class growth analysis (LCGA – a sub-variant of GMM) and latent growth curve modelling (LGCM – a sub-variant of SEM) are flexible statistical methods that allow individuals or latent subgroups to vary in their

initial values (i.e., “intercept”) of a variable of interest (e.g. alcohol consumption levels) and in their rates of change over time (i.e., “slope”). Latent class growth analysis is a special type of fixed-effects growth models (Wardenaar, 2020). A key assumption of LCGA that distinguishes it from GMM is that there is no within-class variation or covariance between growth factors (i.e., intercept and slope). This means that all individuals comprising each LC derived from LCGA are homogeneous with respect to their drinking trajectories (Berlin et al, 2014; Nagin, 1999), which would not be the case for LCs derived from GMM.

Beyond the advantages of LCGA outlined above, the rationale for using this approach in Study 2 is driven by the theoretical framework developed in study 1. A key aspect of the Study 1 framework (and of prior existing social theories not incorporated into the framework, see is the clustering of health risk behaviours, including alcohol use, across social and spatial planes. Both theory and empirical literature suggests that social capital plays a role in this phenomenon (see Study 1 in Chapter 4). Hence, LCGA is suitable for detecting patterns of alcohol consumption in accordance with covariates found to be relevant following the general literature review (Chapter 2) and Study 1 (Chapter 4). Study 2 will provide greater insight into the roles of neighbourhood environments and social capital in a general population sample, by investigating the strength and direction of associations between these variables and group-based alcohol use trajectories. The multilevel data structure examined in Study 2 is also reflective of the Study 1 framework as it accounts for individuals being nested within small areal units conceptualised as neighbourhoods (i.e., spatial clustering of risk behaviours).

Evidence from previous studies using these analytic approaches support the theoretical literature (see Study 1 in Chapter 4) indicating that adverse neighbourhood environments have negative implications for alcohol use (Cambron et al, 2017; Duncan, Duncan & Strycker, 2000) and mental health (Kingsbury, Kirkbride, McMartin, Wickham, Weeks & Colman, 2015). To better understand this variability, it is important that multilevel analyses are used to separate contextual effects from compositional effects; that longitudinal analyses are used to examine temporality; and that consideration is given to qualitative differences between possible “latent” subgroups within a larger population. Multilevel analyses are generally conducted using a two-level data structure, wherein individuals (level 1) are nested within neighbourhoods (level 2). Poortinga et al (2006) used a multilevel mediation analysis with a three-level data structure, in which individuals were nested within neighbourhoods and with sampling points at level 3. The researchers found that, in a large English sample, health behaviours (smoking, drinking, fruit/vegetable consumption) partially mediated the relationship between social capital and health. This highlights the role of social connection in health and wellbeing, and

justifies efforts to further explore the temporal sequencing of neighbourhood social perceptions, mental distress and risk behaviours (i.e., alcohol use).

3.4.1. Data identification and selection

A data mapping exercise was carried out in September 2021 to identify appropriate datasets that could be used to investigate the current research aims. Using the search term “alcohol”, longitudinal and cohort ‘series’ with UK data available from 2010 to 2021 were identified using the UK Data Service and Cohort and Longitudinal Studies Enhancement Resources (CLOSER) websites. Datasets were considered based on the following eligibility criteria:

- Representative, general population sample of England or the UK;
- Assessment of the following variables at three or more timepoints between 2010 and 2021 (to allow for longitudinal analysis): alcohol use, neighbourhood social factors (i.e., social capital and/or social cohesion), mental health (see Section 5.2.2. for further detail regarding these measures);
- Random or stratified sampling techniques were preferred over opportunity samples;
- All or the majority of the sample must be aged 18 or over, as this is the legal alcohol purchase age in the UK;
- Geocoded datasets with linked data at the lower-layer super output area (LSOA) level.

In total, 24 datasets were appraised – including five datasets from the UK Data Service and all 19 of the studies available on CLOSER. The only dataset to fulfil all of the desired criteria was Understanding Society (see Section 5.2. for a detailed description of the population, sampling strategy and data collection intervals). The two most common reasons for rejecting the other 23 datasets were not assessing neighbourhood social factors and inappropriate sample (e.g., comprised exclusively of either youth or older adults). In October 2022, UKHLS data were obtained from the UK Data Service via a Special Licence, which is granted to allow access to detailed but anonymous information.

3.5. Rationale for photo-elicitation interviews (Study 3)

Qualitative studies show that lay individuals are aware of psychosocial influences on their drinking behaviours, which can be positioned at the individual- (e.g. mental distress symptoms), medial- (e.g. perceived social dynamics of, and interactions within, their social networks), and macro- levels (e.g. media and advertising) (Scott et al, 2019; Tran, Robertson & Thyne, 2020). However, some contextual risk factors for poor health are normalised in some neighbourhoods so residents only become critical of these features once prompted to – such as in the case of participatory projects (Molina de-la Fuente et al, 2021). There is also a risk that lay narratives can be misconstrued and misrepresented when analysis and dissemination is directed solely by academic researchers. In the context of alcohol use, this may pertain to differences in employment, opportunities to pursue higher education, socioeconomic and living circumstances during childhood, social networks consisting of relatively high-SES individuals, and access to health education. For example, risky alcohol use is more often observed in unemployed populations, which can be attributed to higher rates of mental disorder, stress, and boredom (Björklund, Söderlund, Nyström & Häggström, 2015; Virgolino et al, 2022).

Similarly, when considering drivers of alcohol use from a life course perspective, individuals with a higher household SES during childhood are more likely to be exposed to a greater variety of opportunities for education, employment, and leisure, which can mitigate the potential for alcohol harms (Lee et al, 2015). The biases and preconceptions about risk behaviours that these privileges may bring can steer the research away from the lived experiences of individuals from low-income settings. This may be through the framing of research objectives that prioritise issues dominating the formal literature rather than exploring matters perceived as important by the communities who experience them. This points to the need for greater community involvement in research. The generation of visual stimuli (e.g. photographs, artwork, film) has been found to be an acceptable method that better conveys community perceptions and increases critical thinking about factors influencing health (Nykiforuk Vallianatos & Nieuwendyk, 2011; Rudkin & Davis, 2007). While quantitative studies investigating social influences on drinking typically report the extent to which alcohol use patterns vary by socioeconomic factors, clinical characteristics, and network/neighbourhood perceptions, qualitative studies have the potential to provide richer investigation of perceptions, attitudes and beliefs of people with lived experience (of drinking and/or drinking problems).

Community-based participatory research (CBPR) and participatory action research (PAR) methodologies are qualitative approaches that differ from qualitative methods such as interviews and focus groups, which are led and analysed entirely by researchers. These approaches seek to empower individuals and communities who are generally from marginalised or hard-to-reach populations (e.g. people with substance use disorders or certain mental health problems, indigenous groups, homeless and street-involved individuals) (Seitz & Strack, 2016; Wallerstein & Duran, 2010). Lay contributors in CBPR/PAR are viewed as collaborators rather than passive participants, and these methods offer them the opportunity to guide the research and bring concerns in their community to the attention of influential individuals and organisations (e.g. policy-makers, commissioners, local councils, health services). The terms CBPR and PAR are often used synonymously without clear distinction to describe research that is grounded in principles of social justice, engages those it seeks to empower in the research process, and attempts to stimulate social action that improves participants' conditions (Cargo & Mercer, 2008). While the two approaches overlap, PAR places greater emphasis on action (e.g. policy change, building social capital) whereas CBPR focuses more so on community engagement in research (Banks et al, 2013; Tapp, White, Steuerwald & Dulin, 2013). Both approaches are often used to underpin social actions or the development of new resources and interventions, such as impacting local smoking policies (Tanasiri, Lew, Kuratani, Wong & Fu, 2011), and can be instrumental in improving health equity (Wallerstein & Duran, 2010). However, the real-world impact of participatory work is seldom evaluated (Seitz & Strack, 2016).

Participatory research frequently relies on arts-based approaches to facilitate expression of community members' concerns and experiences. Some examples include the use of film-making or "digital storytelling" (Costera Meijer, 2013), videographic/interview-based "go-along" methods (Kusenbach, 2003; Tartia, 2018), and photography (Wang & Burris, 1994, 1997), in order to better understand spatial ecology from lay perspectives. Rooted in Freirean pedagogy and feminist theory, Wang and Burris (1994, 1997) developed photovoice as a flexible CBPR/PAR technique that involves engaging (marginalised) community members in a photo-taking task to identify and critically discuss community strengths or concerns. This grassroots approach to motivating social action is appropriate for addressing neighbourhood issues (both objective and subjective) as the resulting photographs act as a "catalyst" for generating ideas that would not be uncovered with such acuity if formal survey methods were to be used (Nykiforuk et al, 2011). As with other forms of CBPR, the overarching goal of photovoice is to empower those whose views and opportunities may be obscured by more powerful groups in a society.

Neighbourhood research has recently capitalised on participatory photography as a way to engage residents in the research process and identify local health risks that may not be captured via less interactive methods. Photovoice has been used to document the health-damaging effects of gentrification (the transformation of working-class neighbourhoods to conform to middle-/upper-class preferences) and has been successful in visually representing the interlinkage of social dynamics and physical space (Sánchez-Ledesma et al, 2020). It is telling that, in traditional qualitative studies (i.e., interviews, focus groups; not CBPR/PAR), participants tend to cite individual-level barriers and facilitators of alcohol use (e.g. mood, existing health conditions, perceived need for treatment and attitudes towards treatment, stressful events like bereavement, proximal social connections like friends, immediate family, work colleagues) more so than contextual factors (Frost et al, 2022; Kelly et al, 2018); yet, in CBPR, participants often make reference to a range of distal socio-environmental issues (e.g. alcohol advertising) and can effectively articulate the links with health (risk) behaviours (Molina-de la Fuente et al, 2021). In line with social cognitive theory, this is somewhat indicative that contextual influences on individuals' drinking behaviour may operate without their full awareness, since they are so prolific and normative in those environments.

Given the limited resources available to complete this study, the broad goal was to collaborate with a sample of Merseyside residents to better understand how they perceive the social dynamics of their neighbourhoods to affect the ways they use alcohol. Although it was hoped that a community-based event would be held to disseminate findings after this PhD, the key focus was on community engagement rather than social action. Therefore, in line with Banks et al (2013), the term CBPR will be used as a broad term to describe the approach used for this study. Through photo-elicitation interviews (PEI; Harper, 2002), the overall aim of the current study is to explore neighbourhood barriers and facilitators of drinking reductions and abstinence amongst people who have considered reducing their alcohol intake and have already stopped drinking. It was originally anticipated that the photovoice method described by Wang and Burris (1997) would be adopted for this study. However, the protocol was amended after careful consideration of various practical and ethical issues, which are described in detail elsewhere (see Section 6.2.7.). The key difference between the two approaches is that photovoice projects places greater emphasis on social action (e.g. reaching policymakers) and the participatory nature of the work, while PEI broadly refers to the integration of photographs into the interview process. In practice, the former involves group discussions to formulate shared narratives and understandings about the photographs and experiences, while the latter typically involves one-to-one sessions between participants and the researcher.

The use of PEI in this study is advantageous for several reasons. Firstly, because the narratives regarding barriers and facilitators of drinking reductions are not constrained by the researchers' expectations of drinking determinants. Secondly, because the photographs can act as prompts to help both researchers and participants to immerse themselves in the environment and generate shared understandings of why those features influence efforts to reduce (or abstain from) drinking. Further to the rationale for using PEI, it is important to recognise that social interactions take place in physical spaces, and the nature of these interactions are likely to differ from place to place, depending on what behaviour is acceptable and expected in those spaces. Therefore, PEI can help to understand not only social determinants of drinking but also spatial and temporal risk factors. For example, the drinking practices embedded within the night-time economy (Aresi & Pedersen, 2016; Atkinson et al, 2022) are distinguishable from those exhibited in the home or in pubs during daytime (Brierley-Jones et al, 2014; Thompson et al, 2018). Qualitative research also suggests that these various drinking practices are gendered and differ by age group (Aresi & Pedersen, 2016; Atkinson et al, 2022; Brierley-Jones et al, 2014; Thompson et al, 2018). However, there is little research investigating the barriers and facilitators of drinking reductions in community samples as there have been greater foci on clinical samples or people with alcohol dependence (Kougiali, Pytlik & Soar, 2021), alcohol service implementation (Johnson, Jackson, Guillaume, Meier & Goyder, 2011), and alcohol help-seeking or treatment (May, Nielsen & Bilberg, 2019), rather than self-guided change.

3.5.1. Ethical considerations for community-based participatory research

Research ethics training was completed in August 2020. Liverpool John Moores University Research Ethics Committee (UREC) granted ethical approval for the community-based qualitative study (Chapter 6) on 28th September 2022 (UREC reference: 22/PHI/017). For the participatory photography aspect of this work, several ethical considerations were made explicitly clear both in a participant information sheet (Appendix 7 and Appendix 8) and during an image ethics training workshop (Appendix 10). The workshop allowed the researcher to confirm that participants understood what was involved in the study prior to giving consent and provided an opportunity to address any questions or concerns about the study.

Participants were cautioned against taking photographs of themselves and of other people, in particular their faces. This was to ensure anonymity, which is important for several reasons. Firstly, by preventing identification of people in the photographs, participants would not face potential consequences such as backlash from other community members or community

leaders for speaking out about local issues that others may disagree with. Similarly, it prevented photographs from being taken of others, without consent, which could have adverse psychosocial implications, such as shaming a regular patron at a local pub. Secondly, it was important to ensure confidentiality because it was not possible to control access to the photographs after dissemination. It was anticipated that study findings and a selection of photographs would be displayed at a public exhibition. However, the emphasis on this study was on co-production so this was not an explicit aim of the study, and it is expected that an exhibition will be held shortly after the programme of research has been completed. Any digital media that included participants' photographic content could have been posted online (e.g. social media, blog posts), which further limited researchers' control over viewing privileges. Despite participants having the right to withdraw throughout the study period, it was not possible to retract media that has already been shared on platforms not controlled by the researcher. Again, this reinforced the need for anonymity and informed consent wherever there may be any risk of identification. To convey aspects of the neighbourhood social environment, they might have wanted to include features of people in some photographs. They were permitted to take photos that include non-identifiable features of individuals, such as hands or silhouettes, but they were informed that this comes with higher risks of the person being identifiable. The researcher asked participants to be mindful that this risk increased further if features such as tattoos, custom clothing, workplace uniform/logo, or birthmarks/scars were visible. Participants were not permitted to take photographs of children under any circumstance.

It was crucial that participants did not put themselves or others at risk to take a photograph in any circumstances. They were advised not to do anything they would not normally do and to be mindful of their safety, especially if they chose to engage in the photography task(s) after having consumed alcohol. Additionally, they were instructed not to include any depictions of illegal activity in their photographs. Again, there were several reasons for this. Firstly, if the photograph depicted another person committing an offence, the participant photographing the occurrence would be at risk of harm as a result of exposing the criminal activity. Secondly, in some instances (i.e., reason to suspect harm towards minors or vulnerable adults, money laundering, or terrorism), the researcher is legally obligated to report this information to prevent serious harm, which means necessarily breaching the ethical guidelines described here (i.e., confidentiality). Finally, if the researcher was to become aware of other forms of criminal activity (e.g. drug-related offences), and possesses evidence of this (i.e., incriminating photographs and/or audio recordings from interviews), both disclosure and non-disclosure would have conferred legal, social and personal risks – particularly as legislation around researcher responsibilities is subject to change.

Participants were given ID codes to ensure confidentiality, and an encrypted spreadsheet linked participants to their respective codes, which were stored separately to their data. Regarding data management, participant data (questionnaire responses, audio recordings and transcripts) were stored securely in password-protected files on a personal Liverpool John Moores OneDrive. Once the audio recordings were transcribed, they were destroyed immediately. It was made clear that the spreadsheet linking participants to their pseudonyms would be retained for three months after the focus group so that participants had adequate time to withdraw from the study. In the case of participant withdrawal, their data could be located using the spreadsheet and destroyed. Once the spreadsheet had been deleted, participants could no longer withdraw from the study, however all retained data was anonymised so that personal identification (even by the researcher managing the data) was not possible. Since this project forms part of a larger thesis, the transcripts were retained up until the final submission of the overall thesis, only for the purpose of checking quotes and refining the write-up. Transcripts and any questionnaire responses were then destroyed.

Prior to recruitment and data collection, the principal investigator attended a three-day participatory photography course held by '*PhotoVoice*' – a UK charity that offers training to guide delivery of participatory photography projects. The sessions covered important practical and ethical issues involved in such projects, including activities in which trainees participated in tasks to gain an understanding of the process from participants' perspectives. Course content was relevant to (although not specifically tailored to) academics, and was also aimed at practitioners, photographers, and third sector organisations. Key considerations addressed in the course, besides ethical concerns applicable to most qualitative and/or participatory research and outlined above, related to ownership and copyright. Given that the photographs were essential to this work, it was made clear that, while participants will own and retain the photographs, joint copyright (with the author) was required to use their photographs for non-commercial purposes (i.e., thesis and any project outputs). This contradicted the guidance provided by *PhotoVoice*, which stated that "copyright is owned exclusively by the participants" (p.20, *PhotoVoice*, 2023). However, this approach was necessary given the limited time and resources available to conduct the study, which did not allow for multiple sessions to revisit the consent process for each image. As specified above, participants could withdraw from the study and retract any photographic materials at any point up until anonymisation of the data. A final moral consideration discussed in the training was that, despite participatory photography being a means to enact social change, participants should never "be led to believe that their circumstances will be dramatically or immediately changed by being involved..." (p.17, *PhotoVoice*, 2023).

In May 2023, LJMU UREC approved a study amendment that permitted recruitment of individuals with a history of alcohol problems from recovery groups. Since the photography tasks and interviews required recalling situations in which one would normally drink alcohol, it was made clear that those interested in participating in the study should not do if they thought this could be detrimental to their recovery. The anticipated protocol, which had included a second photography task, was shortened to include only one photography task, and one-to-one interviews were the preferred data collection method for all participants as opposed to focus groups. Some reasons for this are specified in Appendix 11.

3.6. Triangulation

Capitalising on the benefits of paradigmatic pluralism, integration and triangulation of findings can enable more holistic conclusions to be made, as well as greater practical utility, than the separate qualitative/quantitative components would allow. Triangulation is important for validating the findings of both the quantitative and qualitative aspects of this research programme (Schoonenboom & Johnson, 2017). Integration of findings at the discussion level is the minimum requirement to justify the contention that the work constitutes mixed methods research (Doyle et al, 2016). The approach to triangulation was informed by Farmer et al (2006), and an additional legitimisation process (Onwuegbuzie & Johnson, 2006). Further details of the approach to triangulation are outlined in Chapter 7.

Creswell and Plano Clark (2011) describe three key considerations for mixed methods research: weighting, timing, and mixing. With regards to weighting, the researcher must decide whether the qualitative and quantitative components are equally as important or whether one type of data takes precedence over the other. However, researchers warn against the “tokenistic” use of qualitative research (Doyle et al, 2016) and call for transparent reporting of what is referred to as “the priority decision” (Morgan, 1998), i.e., weighting. This programme of work prioritised qualitative components to some extent – firstly because the conceptual framework developed in Study 1 was primarily based on descriptions of theory and then supported by empirical quantitative evidence, and secondly because there was an emphasis on co-produced knowledge in Study 3, which helped to generate deeper understandings of *why* statistical associations between neighbourhood factors and alcohol outcomes may be found. The timing decision refers to whether a sequential (i.e., qualitative and quantitative data are collected and analysed separately in different phases of the project) or concurrent/parallel (i.e., qualitative and quantitative data are collected approximately simultaneously in the same phase of the project) design is adopted. A sequential design was adopted in this programme

of work because the conceptual framework informed the sampling frames and variable selection for subsequent studies, while Study 2 (quantitative) findings informed the topic guide for the final study. Finally, it is important that researchers clearly convey how, and at what point, the qualitative and quantitative methods will be mixed. Nevertheless, inconsistencies in what constitutes mixed methods research and at which point the mixing occurs are well acknowledged (Johnson, Onwuegbuzie & Turner, 2007). The findings from all three studies were mixed according to a rigorous triangulation protocol (Farmer, Robinson, Elliot & Eyles, 2006) at the end of this programme of work.

Doyle et al (2016) note that integration (i.e., “mixing”) can occur at the design level, methods level, reporting/interpretation level and discussion level in the research process. Integration at the design level involves specifying research questions that explicitly imply a need for a mixed methods approach. Methods level integration can occur through a responsive research design, in which the findings from one study inform some aspect of another study (e.g. sampling frame, topic guide) in the work package. At the reporting/interpretation level, qualitative and quantitative findings are presented in relation to one another, for example, in a table of convergent and divergent themes or via “weaving”. Integration at the discussion level is essential to mixed methods research and involves developing “meta-inferences” (Venkatesh, Brown & Bala, 2013) about the findings from both the qualitative and quantitative aspects of the work to give “a sense of the overall findings” (p.631, Doyle et al, 2016). Hence, an iterative approach to integration is crucial, which may involve revisiting and reformulating the research findings from each study to generate “a whole greater than the sum of its parts” (Doyle et al, 2016, p.630).

CHAPTER 4: Theory synthesis and review investigating the associations and pathways of neighbourhood social factors and alcohol use (Study 1)

4.1. Introduction

Reviews investigating the associations between neighbourhood social factors and alcohol use have generally reported mixed or inconclusive findings (e.g. Bryden et al, 2013; Jackson, Denny & Ameratunga, 2014). Research points to spatial clustering of health risk behaviours like problem drinking, referred to as “disease hotspots” (McLafferty, 2015), which bolsters the rationale for conducting neighbourhood research in the context of alcohol use. There is also limited theory-informed research on these relationships, which impedes more advanced understandings of contextual determinants of health behaviours. Development of a theoretical framework is important for guiding multilevel and longitudinal analyses, which are required for establishing causal mechanisms linking NSC to individual alcohol outcomes (Grimm et al, 2017).

Despite relatively little attention paid to neighbourhood determinants of alcohol consumption compared to other factors, some work has explicitly linked NSC to individual health and wellbeing, health-related behaviours, and mental illness (Almedom & Glandon, 2008; De Silva et al, 2005; Ehsan & De Silva, 2015; Kawachi & Berkman, 2000; Pérez et al, 2020). The health-behavioural pathway described by Kawachi and Berkman (2000) is frequently cited in public health literature. Neighbourhood social capital is theorised to influence health behaviours by: (i) promoting diffusion of health-related information and (ii) deterring health behaviours that do not align with neighbourhood norms via social control (Kawachi & Berkman, 2000). However, many articles fail to give examples or comprehensive explanations as to how these processes operate. It is also common for social capital research to rely on a “network approach” (i.e., Bourdieusian social capital, see Section 1.2.2.), which focuses on an individual’s proximal connections (e.g. family, peers) but typically fails to consider neighbourhood perceptions and interactions (Moore & Kawachi, 2017). The current study adopts a “cohesion approach” (see Section 1.2.2.) to elucidate the role of aggregate NSC on alcohol use and separate these effects from individual-level influences. Most prior literature and reviews focus on adolescent outcomes (Jackson et al, 2014) or examine predictors of alcohol use that are aggregated to the neighbourhood level but do not explicitly relate to the

neighbourhood environment (Bryden et al, 2013). To the author's knowledge, there is currently no review investigating the associations between NSC and adult alcohol outcomes.

The overall aim of this review is to investigate how NSC impacts individual-level alcohol consumption. This primary focus of the study is the effects of neighbourhood social factors on alcohol use, with further attention concentrating on the interplay with mental health. The objectives of the review are:

- To identify and synthesise qualitative evidence that describes theorised pathways linking neighbourhood social factors to substance use;
- To elucidate the theorised role of mental health in the relationship between neighbourhood social factors and substance use;
- To identify and synthesise empirical evidence regarding the relationship between neighbourhood social factors and alcohol use;
- To use theoretical and empirical data to develop a novel conceptual framework that demonstrates hypothesised pathways from neighbourhood social environments to individual-level alcohol use and mental health.

The theory synthesis approach taken in this current study was used as a framework to inform secondary analysis of a large, representative UK longitudinal dataset, which further tested aspects of the conceptual model. This helps to reduce the risk of bias stemming from subjectively reformulating work on “what” associations may exist between the factors of interest, while allowing for creative insight into “how” and “why” neighbourhood social environments affect drinking. Subsequent studies in this thesis will be guided by the conceptual framework, but their findings may also lead to revisiting the framework for further revisions, should the results offer a more nuanced understanding of the social mechanisms involved in drinking behaviour.

4.2. Methods

4.2.1. Methodological overview

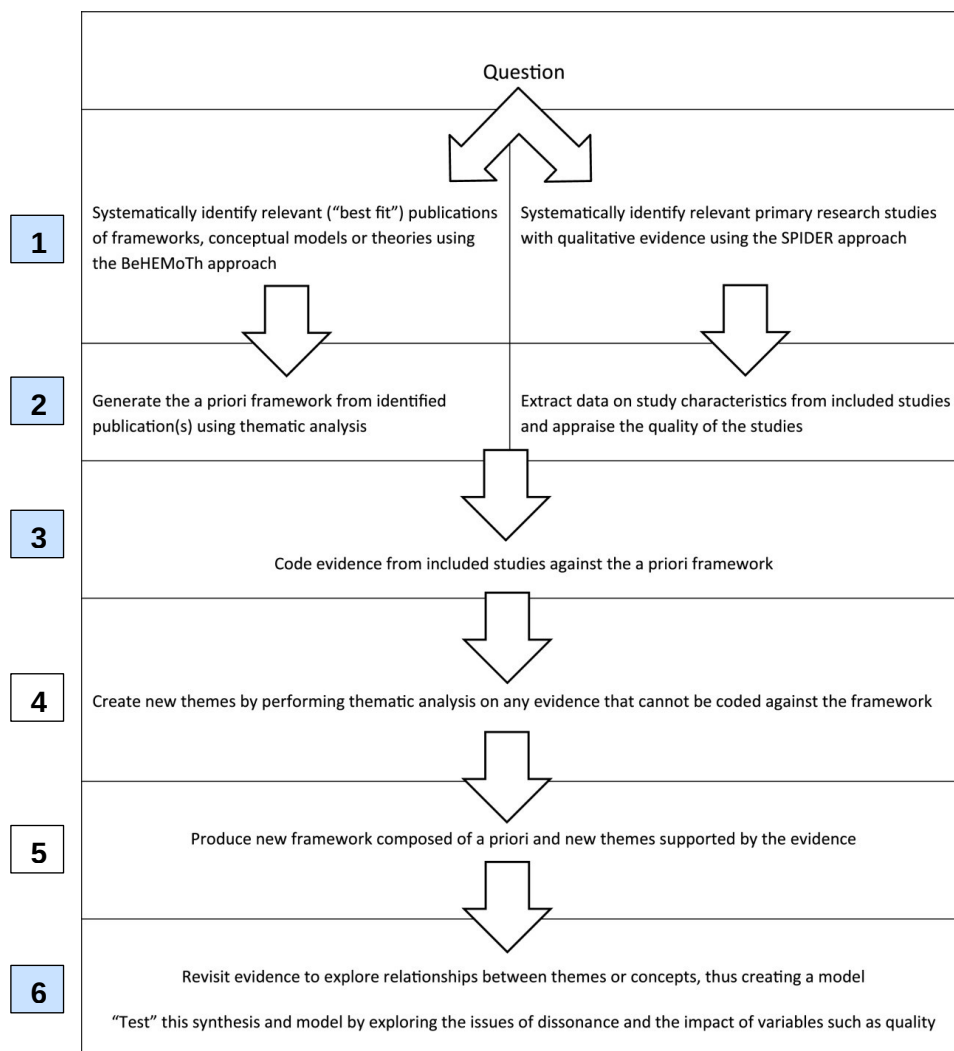
Methodology was informed by previous work in the field that has used techniques such as realist synthesis (Jagosh, 2019; Lorenc et al, 2012), causal mapping (Baxter, Killoran, Kelly & Goyder, 2010), and in particular, the best fit framework synthesis (BFFS, Carroll, Booth & Cooper, 2011; Carroll, Booth, Leaviss & Rick, 2013). The study is reported in accordance with

Preferred Reporting Items for Systematic Meta-Analyses (PRISMA) guidelines (Page et al, 2021).

The BFFS technique involves identifying theories of “best fit” (i.e., those that may not be directly applicable to the population of interest but are based on relevant samples and concepts), synthesising primary studies that underpin the theorised associations, and further developing the theories into a novel, conceptual framework. This was used to make interpretations of theories and primary evidence that went beyond those made in the original papers, in order to locate potential avenues for intervention with regards to problematic drinking at the neighbourhood level. The stages of BFFS are outlined in Figure 1 (Carroll et al, 2013). Only steps 1, 2, 3 and 6 were carried out due to time and resource constraints and the intention that the findings from this review will inform subsequent studies in this PhD thesis. Therefore, the *a priori* framework will instead constitute the final framework. In effect, relevant candidate theories were identified by a first database search, then a second search identified evidence to help inform and refine the emerging conceptual framework. This was complemented by the approaches to narrative summary and theoretical categorisation outlined in previous work (Lorenc et al, 2012; Bonell et al, 2013). If several relevant theories were identified and there was insufficient evidence to justify one taking precedence over the others, all theories contributed towards a larger framework.

This approach was taken for several reasons; firstly, because research into neighbourhood factors requires a multidisciplinary understanding of its concepts (e.g. sociological and criminological perspectives), which is enabled by the initial stages of BFFS. Secondly, the resulting framework is based on both inductive and deductive analysis, which can be completed within a limited timeframe whilst allowing transparent reporting and coding (Booth & Carroll, 2015). Previous research has used BFFS to understand recovery from serious mental illness (Stuart, Tansey & Quayle, 2017).

Figure 1 - Stages of BFFS (Carroll et al, 2013)



4.2.2. Search strategy to identify theories

The BeHEMoTh strategy (Carroll et al, 2013) was used to systematically identify relevant theories or models that helped to explain how neighbourhood social factors influence individual substance use (with a predominant focus on alcohol use). The BeHEMoTh mnemonic is designed so that the search phrase comprises its component aspects: **B**ehaviour of interest, **H**ealth context, **E**xclusions, **M**odels and **T**heories. As advised by the creators of the BeHEMoTh template (Booth & Carroll, 2015), the behaviour of interest was defined more broadly as “substance use” (e.g. alcohol use, smoking, drug use) during this stage because neighbourhood factors have received little attention in alcohol research.

Four databases (PsycInfo, CINAHL, MEDLINE, Social Sciences Citation Index via Web of Science) were first searched in 2020 using the search strategy outlined in Table 3. The search

was last updated on 29th January 2024. Combinations of the terms described below were used to identify journal articles and reviews published in the English language between 2010 and 2024. The rationale behind this selection of dates was that, in 2010, a global strategy aiming to reduce harmful alcohol use was promoted by Member States of the WHO, which precipitated an increase in implementation of alcohol policies and interventions around the world (WHO, 2010). Since this review covers both UK and international research, this range of dates allowed identification of the most recent literature, whilst attempting to lessen the heterogeneity of neighbourhood contexts in relation to alcohol use. Relevant theories published before 2010 would also be identified as it was assumed that robust theories would continue to be cited in more recent papers. Only papers that related to adults in “Western countries” (Table 4) were included, which is an approach used by an earlier systematic review (Gariépy, Honkaniemi & Quesnel-Vallée, 2016). The rationale for adopting this approach is the similar prevalence of alcohol consumption, sociocultural aspects of drinking contexts, and shared history of alcohol consumption patterns in these countries (Pennay & Room, 2016; WHO, 2018). These regions differ from other global territories such as the Arab states in which many areas prohibit alcohol sale and consumption (Ghandour et al, 2016), and East Asian countries, in which alcohol often plays a more central role in business negotiations than leisure and is consumed according to specific cultural etiquette (Jiang, 2011; Wang, Huang, Xu & Zhang, 2023).

Table 3 - Search strategy for identifying theories using the BeHEMoTh template

BeHEMoTh aspect	Search terms
Behaviour of interest	alcohol* OR drink* OR drunk* OR smok* OR drug* OR addict* OR “substance *use”
Health context	“neighbo\$rhod cohesion” OR “community cohesion” OR “social cohesion” OR “social capital” OR “civic engagement” OR “civic participation” OR “community engagement” OR “community participation” OR “trust” OR “informal control” OR “reciprocity” OR “sense of community” OR “neighbo\$rhod attachment” OR “neighbo\$rhod belonging”
Exclusions	Markov OR “model* of care” OR animal* OR disaster* OR immigrant* OR migrant*
Models or theories	model* OR theor* OR framework* OR concept* OR qualitative*

4.2.3. Eligibility criteria for theories

The papers retrieved from the database search were screened to ensure that they outline a theory of how and/or why neighbourhood social factors are associated with substance use. Theories and frameworks were drawn from disciplines other than public health research, such

as criminological and sociological literature where content was relevant to the research questions. Regarding what constitutes a “theory”, the current review used the definition reported in Booth and Carroll (2015, p. 221): “a set of inter-related concepts, definitions and propositions that present a systematic view of events or situations by specifying relations among variables, to explain and predict the events or situations. The notion of generality, or broad application, is important.” Although there was flexibility with regards to the inclusion of theories, papers describing theorised links between neighbourhood social environments and mental health/risk behaviours solely in relation to minority population health (e.g. acculturation, experiences of discrimination) were excluded as these were specific issues beyond the scope of this review.

4.2.4. Search strategy to identify empirical studies

This more focused search involved systematically searching the same four databases for studies that reported quantitative associations between NSC and alcohol use only (as opposed to substance use more broadly). These studies were used to make judgements about the organisation of theoretical components (identified in the first database search) and the credibility of the framework. The search terms for “health context” in Table 3 were re-entered with the three alcohol-specific terms (i.e., alcohol* OR drink* OR drunk*) and no exclusions or terms synonymous with “theory” (i.e., the final two rows of Table 3). Again, the search was restricted to identify journal articles published between 2010 and 2024 in the English language.

4.2.6. Study selection and eligibility criteria for studies

All identified papers were imported into EndNote 20 to aid reference management and screening. The studies were screened to ensure they met the eligibility criteria described in Table 4. Only studies conducted in Western countries were included in the review. A previous review on the role of social support in protecting against depression has also used this approach and the same selection of countries that were eligible for inclusion (Gariépy et al, 2016). Studies in non-Western countries were excluded from the current review because sociocultural differences (e.g. individualistic vs collectivistic countries, gendered drinking norms) are likely to impact the relationship between neighbourhood social environments and drinking outcomes (Griswold et al, 2018; Mackinnon et al, 2017). Given the lack of unanimity in defining “neighbourhood” across the literature, the definitions used in the primary studies

were taken into account when organising the framework. Studies were excluded if they conceptualised neighbourhoods only on the grounds of sociodemographic or cultural identity (e.g. ethnic enclaves within administratively defined neighbourhood boundaries) and the sample did not share some spatial relationship. For example, a group of connected social media users would not be considered a “neighbourhood”, although the term “community” may be applicable. Tools used to assess the social environment must have made explicit reference to the neighbourhood or local area. Studies that examined social capital embedded in networks (e.g. friendships, recovery groups, family) were not eligible for inclusion unless these measures were aggregated to the area-level and could offer insight into how personal connections *within* the neighbourhood related to alcohol use.

Table 4 - *Summary of eligibility criteria for primary (empirical) studies identified from systematic database searching*

Criterion	Inclusion	Exclusion
Alcohol use	The study reports any data on individual-level alcohol consumption (e.g. frequency, quantity, drunkenness or drinking patterns) or alcohol use disorders. Studies may have recruited samples of non-problem drinkers, problem drinkers (including those with alcohol use disorder), or random samples in which problem drinkers, non-problem drinkers and non-drinkers were included.	All participants are abstinent from alcohol. Studies reporting on alcohol-related consequences (e.g. hospital admissions, alcohol-related mortality, driving while intoxicated), alcohol expenditure, and alcohol availability were excluded as this was outside the scope of the current review.
Neighbourhood social factors	The data relates to neighbourhood social cohesion, NSC, or specific indicators of these concepts. Concepts not stated explicitly here were also relevant, providing that they explained how members within a neighbourhood interacted or were perceived to interact among their neighbours.	Data related only to the physical or socioeconomic neighbourhood environment and did not refer to neighbourhood social factors specifically. The social factors were not conceptualised or operationalised in relation to neighbourhoods (or other socio-spatial units) specifically. For example, studies examining generalised trust (i.e., “ <i>most people can be trusted</i> ”) that was measured and analysed at the individual level were not eligible. Similarly, studies were excluded if they assessed social participation as membership in organisations without explicit emphasis on those within one’s residential area or without aggregation to the neighbourhood level. Studies that referred to “community” broadly were not

		excluded if there was some indication that this was geographically anchored, at least in part. Data related to online communities. The study measured concepts related specifically to the health of specific demographic groups (e.g. acculturation, discrimination, other factors linked to immigrant health) as neighbourhood factors.
Design / article type	Journal article Individual-level or multilevel – however, individual-level studies assessing social capital must have made explicit reference to the neighbourhood environment Cross-sectional or longitudinal	Intervention studies, experimental studies Book chapters, grey literature Reviews
Sample	Adults (aged 18+) Western countries, including: USA, Canada, UK, countries in the European Union (EU) and European Free Trade Association, Australia, and New Zealand	Studies in which all participants have an illicit-drug use disorder were excluded; firstly, due to the confounding effects of polysubstance use patterns, and secondly, because drug acquisition involves criminal activity, which is a defining feature of neighbourhood disorder. Studies that did not purposefully sample drug users but included some drug users (<50% reporting a drug other than alcohol to be their primary substance) in their sample were not excluded. Studies focusing on particular demographic groups and their unique experiences of the neighbourhood social environment (e.g. the role of acculturation in immigrant health, discrimination faced by LGBTQ+ groups) were excluded. Animal studies
Results	Reports associations between alcohol use and neighbourhood social factors	Neither alcohol use nor neighbourhood social factors were reported Results were contextualised in the field of disaster research (e.g. investigating social cohesion in relation to community recovery from flooding or earthquakes)

4.2.7. Quality assessment

The Newcastle-Ottawa Scale (N-OS, Wells et al, 2011) was used to assess the quality of empirical, quantitative studies. Two versions of the N-OS exist: one for case-control studies and one for cohort studies, while an “unofficial” adaptation of the tool exists for assessing cross-sectional studies (Modesti et al, 2016). Cross-sectional studies were appraised with the latter tool and longitudinal studies were appraised with the tool for cohort studies. Both

versions comprise three sections relating to: sample selection, comparability of cohorts/cases and controls, and reporting of the outcome. The cohort assessment tool is scored out of eight stars and the tool for cross-sectional studies is scored out of 10 stars. For the sample selection section, longitudinal studies can be awarded up to three stars and cross-sectional studies can be awarded up to five stars. For the comparability section studies can receive up to two stars, and for the outcome assessment section studies can receive up to three stars. Currently, no formal thresholds exist to categorise studies based on quality. To aid comparison of studies rated using different versions of N-OS, quality was assessed according to tertiles based on N-OS scores as percentages. Thus, <33% indicates low quality, 34%-66% indicates medium quality, and 67%+ indicates high quality. Studies were not rejected based on their N-OS score.

4.3. Analytic approach

The theoretical arguments were deconstructed and reduced to their core concepts, which were analysed on NVivo (version 12) using thematic analysis (Braun & Clarke, 2006; Braun & Clarke, 2019). In line with the methodology specified by Braun and Clarke (2006; Braun & Clarke, 2019; Braun & Clarke, 2021), the researcher responsible for coding the data familiarised themselves with the data (i.e., extracting and reading the texts multiple times), created preliminary codes based on salient topics, identified and grouped common elements of the data to generate themes from the codes, then further refined and labelled the themes. This technique was used to analyse empirical qualitative studies and any other papers that described the mechanisms linking neighbourhood social factors to mental health/risk behaviours (mostly in the introduction or discussion sections). A reflexive approach to thematic analysis was adopted as opposed to a coding reliability or codebook approach (Braun & Clarke, 2019; Braun & Clarke, 2021). This is because only one researcher analysed the data (which is not compatible with a coding reliability approach) and also because this review constitutes a secondary analysis of already-established theories and so it is intended that the researcher interprets meaning from the dataset in a purely qualitative manner. A core aspect of reflexive analysis is that the researcher considers their own roles, experiences, and biases in the production of “new” knowledge. The position of the researcher is provided in Section 1.6.

The theoretical texts were analysed iteratively using a combination of deductive and inductive analysis. First, any information regarding the mechanisms linking neighbourhood social factors to mental health or risk behaviours was coded inductively. Codes that were synonymous with each other were merged and grouped with other similar codes under an

overarching theme. The principles of included 'named' theories were used to guide the refinement of labels and grouping of codes under broader themes. This is where deductive reasoning was employed. Upon revisiting the individual codes and themes, more nuanced understandings of the mechanisms were inferred, which led to further revisions (i.e., merging codes or separating out singular codes into multiple new codes with distinct meanings). Both semantic and latent approaches to coding were utilised throughout the analytic process, with neither approach being favoured over the other. The semantic approach is purely descriptive and involves coding the data in its raw form. For example, if neighbourhood social factors were explained to influence mental health by inducing stress, the relevant code would be "stress". Latent coding is more subjective and involves drawing on creative insight to infer a deeper meaning than is explicitly presented in the texts. This approach was used when explanations of how neighbourhood factors affect alcohol/substance use were ambiguous and when deductive reasoning did not permit a clear idea of how codes should be labelled or grouped. For example, the current theory synthesis identifies "time perspectives" as a potential mechanism linking neighbourhood social environments to individual alcohol use. However, this term is not explicitly used in the included papers, which instead refer to the role of life expectancy, motivation, future prospects and life chances, and the relevance of time perspectives was inferred from these details.

Data from empirical studies were extracted, and the study characteristics and findings were summarised in a Microsoft Excel spreadsheet. Details included: (first) author surname, year of publication, article title, journal, study aims, country, design, population from which the sample was drawn, study sample, sampling method, sample size, age, gender, response rate, alcohol variable(s) assessed, whether or not mental health was assessed (and if so, how this was operationalised), neighbourhood social factor(s) assessed, level of analysis, analytic approach, and summary of findings. No quantitative analysis was conducted. The findings were compared against the newly developed conceptual framework and are qualitatively described in Section 4.4.

4.3.1. Constructing the framework and supporting narrative

The codes and themes were organised to reflect the theorised pathways from neighbourhood social environments to alcohol use and mental health. Note that, although many papers referred to the use of substances other than alcohol, the mechanisms they described are presented in relation to drinking behaviours in subsequent sections. These pathways were visually mapped using *Miro*, an online resource for collaborative mind-mapping and illustrated

in Figure 4. It was intended that empirical studies would help inform framework construction, but most of these articles only provided information on the strength or direction of the relationship between neighbourhood factors and alcohol use (e.g. reporting odds ratios, correlation coefficients), rather than testing relevant models. This was refined on the basis of discussion with the PhD supervisory team.

A narrative summary of the findings and framework was developed based on interpretation of how the codes and themes linked together to reflect causal pathways from neighbourhood social environments to alcohol use. While studying causation implies the use of a positivist paradigm, the subjective nature of qualitative synthesis lends itself to an interpretivist paradigm. The approach to narrative summary drew on lines-of-argument synthesis, which involves translating concepts into one another to present a holistic, meta-ethnographic account of the data (Noblit & Hare, 1988). The premise is that inductive analysis is used to identify “parts” of different studies that can be pieced together to form social explanations of a given phenomenon (i.e., alcohol use in this study).

4.4. Results

4.4.1. Overall sample

A total of 89 unique papers were included in the review. Of these, 78 articles described relevant theory and 26 provided empirical quantitative evidence regarding the effects of neighbourhood social environments on alcohol or other substance use. Fifteen studies that reported empirical quantitative findings on alcohol use were also included in the qualitative theory synthesis. Figure 2 summarises the study selection process for empirical studies. Studies were most frequently excluded because measurements of social capital were not specific to neighbourhood environments (i.e., individual-level social capital measurements did not include items that related specifically to neighbourhoods or social capital scores were not aggregated to neighbourhood-level). As shown in the first PRISMA diagram (Figure 2), four studies identified in earlier searches (but not identified in the current searches) or included in an identified review were also included. A second PRISMA diagram (Figure 3) presents the study selection process for papers that described relevant theory in the context of neighbourhoods and substance use. Similar to the search for empirical studies, the most common reason for exclusion of theory papers was that the text did not relate explicitly to neighbourhood contexts.

4.4.2. Theory papers

A total of 2,842 theory papers were identified in the four databases (Web of Science SSCI: n = 1,680; MEDLINE: n = 421; CINAHL: n = 189; PsycINFO: n = 552), including 669 duplicates, which were removed. This left 2,173 papers to be screened for eligibility. Based on the titles and abstracts, 167 papers were retained for full-text screening. The 78 eligible papers that qualitatively referred to the theorised relationships between neighbourhood social factors and substance use were divided into central and secondary papers. Central papers refer to those which primarily determined the structure of the conceptual framework. These papers provided more detailed accounts of the mechanisms underlying the relationships of interest, supplemented descriptions of theorised relationships with specific examples of how they may be observed in reality, and/or described theory or mechanisms that were not mentioned by other papers (i.e., indicated that data saturation was not yet reached). Secondary papers were articles that aided framework construction but provided only brief explanations, or were less relevant to alcohol use behaviours (e.g. primarily focused on neighbourhood effects on illicit drug use). Twenty five papers were categorised as central papers while the remaining 53 papers were categorised as secondary papers.

Reflective comments:

It was initially anticipated that the review would be limited to studies conducted in high-income countries, as defined by the World Bank classification system. However, this approach meant including studies conducted in some East Asian and Middle-Eastern countries that would likely have poor comparability with studies conducted in “Western countries” due to substantial differences in macro-level factors (e.g. cultural norms around alcohol, crime and unemployment rates, healthcare accessibility). After discussion with my Director of Studies, it was decided that the focus would be further restricted to “Western countries”.

I found it particularly challenging to specify theorised mechanisms linking NSC to alcohol use as I had difficulty distinguishing indicators of NSC from the consequences of NSC – for example, in the context of this study, social participation may present opportunities to drink, and drinking in these social situations can promote future social participation and thus more opportunities to drink. This echoes some of the critiques of social capital theory that are presented in Section 1.2.2.

Figure 2 - PRISMA flow diagram (Page et al, 2021) of the study selection process for empirical studies

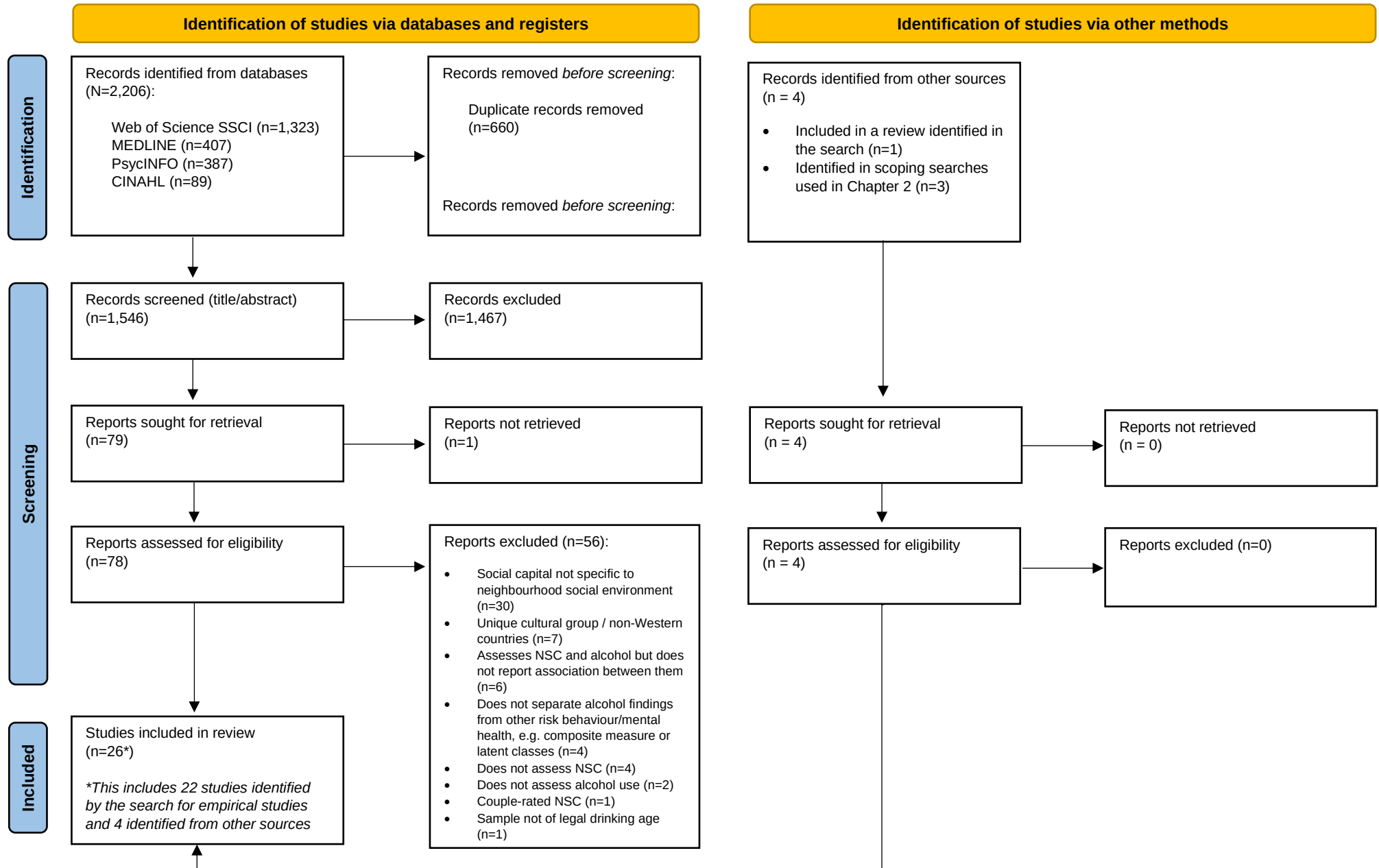


Figure 3 - PRISMA flow diagram (Page et al, 2021) of the study selection process for papers that describe relevant theory

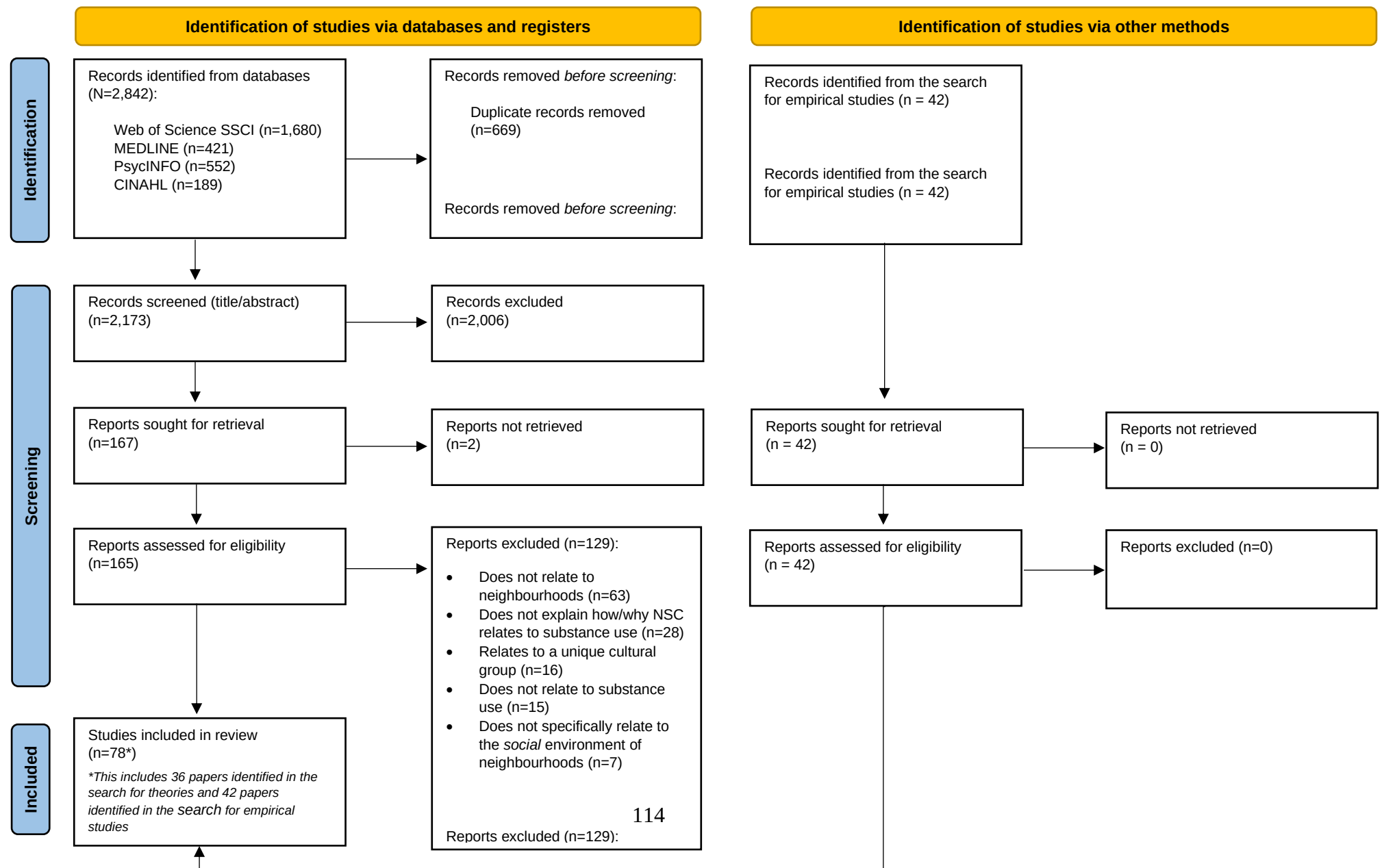


Table 5 - Characteristics of empirical quantitative studies and relevant findings

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
Ahern	2015	To examine the relation of neighbourhood alcohol outlet density and norms around drunkenness with alcohol use disorder using the rare outcomes analysis approach	USA	Cross-sectional (secondary analysis)	Adults aged 18+ from the New York Social Environment Study (NYSES) 47% male and 53% female	Random	4,000 (in New York's 59 community districts)	AUD (past year): World Mental Health Comprehensive International Diagnostic Interview (WMH-CIDI) alcohol module, in accordance with DSM-V criteria	Neighbourhood drinking norms: proportion of neighbourhood residents who felt it was unacceptable to drink alcohol. Questions were adapted from the National Survey on Drug Use and Health. Analysed at neighbourhood-level	Marginal risk of AUD assessed using targeted minimum loss-based estimation (rTMLE) for rare outcomes with logistic regressions Individual-level covariates included sociodemographic and socioeconomic factors, and alcohol use prior to living in current neighbourhood Neighbourhood alcohol outlet density included as a neighbourhood-level covariate	Marginal risk of AUD under permissive norms was 3.15% and under restrictive norms was 1.10%. Marginal risk difference = 2.05% (95% CI: 0.89%–3.21%) No additive interaction between outlet density in neighbourhood drinking norms
Borgonovi	2010	To examine to what extent social capital can promote individual well-being in the form of good physical and mental health	UK	Secondary cross-sectional and longitudinal analyses of longitudinal data	Five waves from each of two cohort studies that included all individuals born in Britain in a specific week in 1958 and 1970: National Child Development Survey (NCDS) and the 1970 British Cohort Study (BCS). Assessments were carried out at birth, young childhood, late childhood, and age 33/34, plus at age 46 (for NCDS only).	Birth cohort (systematic) sampling	Not reported (reported that initial sample sizes for each cohort study was approximately 17,500)	Alcohol abuse (past week): >21 units for males or >14 units for females (binary indicator)	Social trust: Whether respondent trusts people in their local area (yes/no) Individual-level	Cross-sectional analysis: probit models to estimate marginal effects Longitudinal analysis takes a life cycle approach and controls for childhood circumstances as well as adulthood circumstances. Adulthood circumstances include sociodemographic characteristics.	No significant association between social trust and alcohol abuse at age 34 (BCS), regardless of whether only adulthood controls are included or adulthood and childhood controls are both included. Significant negative association at age 46 (NCDS) when controlling for adulthood circumstances only (-0.033, 0.020) and when controlling for both adulthood and childhood

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
					Gender distribution not reported					Childhood circumstances include family socioeconomic position, family emotional support and engagement, health and wellbeing in childhood.	circumstances (-0.036, 0.020) (both $p < 0.1$)
Chauhan	2016	To examine the relationship between binge drinking and three neighbourhood characteristics simultaneously while controlling for individual characteristics, and to determine whether these relationships vary by race/ethnicity	USA	Cross-sectional (secondary analysis)	Adults aged 18+ from the New York Social Environment Study (NYSES) who indicated they had drank alcohol in the past year and had lived in their neighbourhood for at least one year. Ethnic groups other than White, Black and Hispanic were not included. 61.6% male and 38.4% female	Random	1,415 (in New York's 59 community districts. In analyses, 7 districts were excluded for Whites, 9 for Blacks and 4 for Hispanics)	Binge drinking: 5 or more drinks in 2 hours for men and 4 or more drinks in 2 hours for women	Collective efficacy: operationalised as: 1. Informal social control: 5 items assessing the likelihood of neighbours intervening in children's deviant activity, a person being threatened or attacked, and whether the community would work together to prevent the closure of a fire station 2. Neighbourhood social cohesion: 5 items assessing if neighbours are close knit, people willing to help, people do not get along, people do not share the same values, people can be trusted Neighbourhood drinking norms (acceptance of drunkenness):	Generalised estimating equations for overall sample and by ethnicity Controlled for individual sociodemographic and socioeconomic factors	Individual-level analyses: For the total sample, individual-level acceptance of drunkenness was positively associated with binge drinking (OR = 2.32, 95% CI: 1.67-3.22). Stratified by ethnicity, acceptance of drunkenness was positively associated with binge drinking for Whites (OR = 3.23, 95% CI: 2.23-4.68) but not other ethnic groups. Individual-level collective efficacy not associated with binge drinking for full sample or when stratified by ethnicity. Significant interaction between ethnicity and acceptance of drunkenness Neighbourhood-level analyses: No significant association between neighbourhood-level collective efficacy and binge drinking. Neighbourhood-level

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
									proportion of neighbourhood residents who felt it was unacceptable to drink alcohol. Questions were adapted from the National Survey on Drug Use and Health. Both measured and analysed at individual- and neighbourhood-level. Neighbourhood-level measurements were based on the total NYSES sample (N=4,000).		acceptance of drunkenness positively associated with binge drinking (OR = 1.22, 95% CI: 1.09-1.37). Stratified by ethnicity, acceptance of drunkenness positively associated (OR = 1.20, 95% CI: 1.05-1.38) and collective efficacy negatively associated (OR = 0.75, 95% CI: 0.62-0.91) with binge drinking for Whites only. No significant interaction between ethnicity and acceptance of drunkenness or collective efficacy
de Gelder	2017	To assess the magnitude of differences between adults living in urban areas across Europe with regard to less than good self-assessed health, psychological distress, overweight and obesity, daily smoking, binge drinking and infrequent physical exercise. To determine whether and to what extent such differences can be explained by differences in socio-economic status (SES) and in physical and social environments.	9 European countries: France, Germany, Lithuania, Netherlands, Norway, Romania, Slovakia, Slovenia, UK	Cross-sectional (secondary analysis)	Adult (aged >19) respondents from the EURO-URHIS 2 project from 16 urban areas in 9 European countries 48% male 52% female	Stratified, random (reported in Pope et al, 2017)	14,022 (in 16 urban areas in 9 European countries)	Binge drinking: 'How often do you drink six units or more of alcohol at once?'	Attachment to the immediate and larger place of residence Perceived neighbourhood social cohesion: 4 items assessing sense of belonging, people willing to help, not sharing values, always having someone to help Assessed at individual-level and used to assess between-area variation	Multilevel logistic regression (to compare between-area differences) Median odds ratios Adjusted for age and gender, SES, neighbourhood attachment and social cohesion, social contacts, quality of green spaces, noise and traffic	Neighbourhood attachment and cohesion did not explain area differences in binge drinking

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
Dupuis	2016	Validation of a Perceived Neighborhood Social Cohesion Questionnaire (P-NSC) that could be used among French-speaking and German-speaking populations	Switzerland	Secondary cross-sectional analysis of longitudinal data (with 15-month follow-up)	Adult men who were enrolled from three of Switzerland's six federal military recruitment centres, in Lausanne (French-speaking area), and Windisch and Mels (German-speaking area); first follow-up only 100% male	"Virtually the entire Swiss male population in this age group was eligible for inclusion in C-SURF" (Tsai et al, 2020, p.2)	5,065	Alcohol use (past year) Alcohol dependence (past year): DSM-IV-TR Frequency of risky single occasion drinking (RSOD): 6 or more standard drinks on one occasion	Neighbourhood social cohesion: assessed with the Neighbourhood Social Cohesion Questionnaire: <u>Cognitive aspects:</u> 16 items assessing trust, attachment to neighbourhood, tolerance and respect Measured and analysed at individual-level	Split-half correlations recalculated with Spearman-Brown correction formula Point biserial, Spearman and Pearson correlations Controlled for age, community size and language	Significant but weak correlations between perceived neighbourhood cohesion and alcohol use/dependence Composite neighbourhood cohesion positively associated with alcohol use ($r_{pb} = .122$) and RSOD ($r_{pb} = .080$) but negatively associated with prevalence ($r = -.037$) and severity ($r = -.049$) of alcohol dependence (all $p < .01$) With regards to specific indicators of neighbourhood cohesion, the directions of associations with alcohol outcomes remained the same as those for composite neighbourhood cohesion. Of the three neighbourhood cohesion indicators, tolerance was most strongly associated with all alcohol outcomes.
Kim	2020	To examine perceived neighbourhood social cohesion in relation to a range of health and well-being outcomes	USA	Secondary analysis of longitudinal data	Participants (older adults, aged 50+) that responded to the 2010/2012 wave of the Health and Retirement Study (HRS) At pre-baseline: 41% male and 59% female	Multistage area probability sample of households	12,998	Ever binge drinking (past 3 months): 4+ drinks on one occasion	Perceived neighbourhood social cohesion: (4 items – feel part of this area, people will help, people can be trusted, people are friendly) Measured and	Logistic regression models Generalised linear model Linear regression models All models controlled for sociodemographic characteristics, pre-	Positive association between neighbourhood cohesion and binge drinking Compared to those in the lowest tertile (reference group), participants in the middle (OR = 1.34,

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
									analysed at individual-level	baseline childhood abuse, pre-baseline religious service attendance, pre-baseline values of the outcome variables, personality factors, and the pre-baseline value of the exposure	95%CI [1.05-1.71]) and highest (OR = 1.43, 95%CI [1.09-1.87]) tertiles of neighbourhood cohesion had increased odds of binge drinking
Kuipers	2012	To simultaneously investigate the relationship of neighbourhood disorder and social cohesion with hazardous alcohol use	Netherlands	Secondary cross-sectional analysis of repeated cross-sectional data	Dutch adults (18+) from the 2006–2009 National Integrated Survey on Living Conditions (POLS) and Netherlands Housing Research (WoON) survey 50.5% male and 49.5% female	Stratified, two-stage sampling (for POLS; reported by Bethlehem & Schouten, 2004)	14,258 (in 1,546 area units)	Hazardous alcohol consumption: based on quantity/frequency measures for a typical week (women: ≥14, ≥21, and ≥28 drinks/week Men: ≥21, ≥28, and ≥35 drinks/week)	Neighbourhood social cohesion (9 items – unpleasant to live in neighbourhood, attachment, feel at home, in touch with direct neighbours, in touch with other neighbours, people treat each other nicely, solidarity, people hardly know each other, satisfaction with population composition) Assessed at neighbourhood-level; aggregated individual scores grouped by zip code	Multilevel logistic regression models Adjustment for age, gender, ethnicity, marital status, education, income, wealth, predominant neighbourhood religion, and population density	No linear relationship between neighbourhood cohesion and hazardous drinking but moderate neighbourhood cohesion was associated with higher odds of hazardous drinking for males (OR = 1.29, 95% CI: 1.08-1.53)
Kuipers	2013	To assess possible explanations for the association between heavy drinking and neighbourhood deprivation in the Netherlands	Netherlands	Secondary cross-sectional analysis of repeated cross-sectional data	Dutch adults (18+) from the 2004–2009 National Integrated Survey on Living Conditions (POLS) across 1722 neighbourhoods Neighbourhood level variables	Stratified/random	30,117 (in 1,722 area units)	Chronic heavy drinking: 14 or more drinks per week for women, 21 or more drinks per week for men, in line with British Medical Association	Neighbourhood social cohesion: 9 items Analysed at neighbourhood-level, as aggregated mean scores	Logistic multilevel regression Multilevel models with random intercept at the neighbourhood-level Controlled for basic demographic characteristics,	Positive relationship between social cohesion and binge drinking but not chronic heavy drinking There was no linear relationship between neighbourhood cohesion and chronic

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
					derived from 2006 Netherlands Housing Research (WoON) survey 45% male and 55% female in deprived areas 47.1% male and 52.9% female male in rest of Dutch areas			guidelines Episodic heavy drinking: 6 or more drinks in 1 day at least once a week		measures of the respondent's SES, and (neighbourhood-level variables:) population density, social cohesion and percentage of Muslims. All models controlled for the survey year to correct for the secular trend in heavy alcohol use.	heavy drinking. The highest levels of binge drinking were observed in the most cohesive neighbourhoods (OR = 1.24, 95%CI [1.05-1.45], compared to the reference group, which was the lowest quintile of neighbourhood cohesion). Neighbourhood social cohesion slightly weakens (i.e., mediates) the relationship between neighbourhood deprivation and heavy drinking
Larm	2016	To examine whether social capital and sense of coherence are associated with hazardous alcohol use in a large population-based Swedish sample	Sweden	Cross-sectional (secondary analysis)	Adults aged 18-84 drawn from a general population sample of 68,710 participants from 5 Swedish counties 45.5% male and 54.5% female	Multistage stratified sampling	40,674	Hazardous alcohol use: AUDIT-C	Neighbourhood social trust (as an indicator of social capital): 4 items (e.g. <i>"can people in the neighbourhood be trusted?"</i>; other items not reported) Measured and analysed at individual-level	Bivariate associations and multivariate logistic regressions Model 1: covariates and social capital dimensions Model 2: covariates, social capital dimensions and sense of coherence (SOC) Model 3: interaction effects between social capital dimensions and SOC Assessment of sex differences: Model 4: sex, covariates, social capital dimensions, SOC	Bivariate associations: In men: Low neighbourhood social trust associated with higher odds of hazardous drinking (OR = 1.49, 95% CI: 1.29-1.73) In women: Low neighbourhood social trust associated with higher odds of hazardous drinking (OR = 1.82, 95% CI: 1.61-2.06) Multivariate logistic regressions: In men: Low neighbourhood social trust not associated with hazardous drinking In women: Low neighbourhood social

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
										Model 5: added interactions between social capital and sex Model 6: added interactions between SOC and sex Model 7: three-way interactions between social capital dimensions, SOC and sex Covariates include sociodemographic and socioeconomic factors (not including sex), stressful life events and psychological wellbeing	trust remained significantly associated with higher odds of hazardous drinking in all 3 models Model 1: OR = 1.37 (95% CI: 1.17-1.61) Model 2: OR = 1.31 (95% CI: 1.12-1.54) Model 3: OR = 1.42 (95% CI: 1.14-1.78) No significant interaction between neighbourhood social trust and SOC. Sex differences: Model 4: OR = 1.15 (95% CI: 1.02-1.30) Model 5: OR = 0.95 (95% CI: 0.79-1.15) Model 6: OR = 1.15 (95% CI: 1.02-1.30) Model 7: None of the three-way interactions were significant
Lê	2010	To empirically assess the relation between neighbourhood education inequality and alcohol use in New York City, and explicitly examine the role of overall and education-subgroup-specific neighbourhood drinking norms as possible mediators between education inequality and alcohol use.	USA	Cross-sectional (secondary analysis)	Adults aged 18+ from the New York Social Environment Study (NYSES) 47% male and 53% female	Random	3,888 (in New York's 59 community districts)	Alcohol use: Drinks per day – calculated by multiplying the average number of drinking days in a month by the number of drinks consumed per drinking day and dividing by 30	Neighbourhood drinking norms: proportion of neighbourhood residents who felt it was unacceptable to drink alcohol. Questions were adapted from the National Survey on Drug Use and Health. Analysed at neighbourhood-level	General estimating equation Poisson regression models Individual-level covariates included sociodemographic and socioeconomic factors, and alcohol use prior to living in current neighbourhood Neighbourhood-level covariates included educational attainment, median income, and income inequality	No significant association between (restrictive) neighbourhood drinking norms and alcohol use. Neighbourhood drinking norms did not mediate the relationship between neighbourhood-level education inequality and alcohol use.

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
Lin	2012	To further our knowledge regarding the impact of neighbourhood cohesion on people's consumption behaviours (i.e. patterns of alcohol use and tobacco and cannabis consumption) in New Zealand differentiating between frequency and quantity consumed	New Zealand	Cross-sectional (secondary analysis)	Adult (18+) respondents from the Health Behaviours Survey and the Drugs and Health Behaviours Survey: Alcohol, across 1572 census area units (spatial units) (Outliers were removed: participants reporting drinking more than 3 times per day and drinking more than 40 drinks per occasion) 43% male and 57% female	Not reported	14,757 (in 1,572 census area units)	Alcohol consumption: total annual drinking frequency and typical drinking quantity in ml of pure alcohol	Neighbourhood cohesion: 7 items – people are willing to help, neighbours watch out for kids, close-knit neighbourhood, can borrow from neighbour, can deal with problem with neighbours, cannot be trusted, people will take advantage of you) Measured and analysed at individual-level and area-level (mean of all social cohesion scores within each area)	Two-level random intercept regression model Adjusted for sociodemographic factors, area-level deprivation, and neighbourhood cohesion (individual-level)	Significant positive association between individual-level social cohesion and alcohol use frequency But individual-level social cohesion associated with drinking smaller amounts on occasion No significant independent effect of area-level neighbourhood social cohesion on alcohol use (frequency or quantity)
Mohnen	2012	To examine whether health-related behaviours explain the association between neighbourhood social capital and individual health.	Netherlands	Cross-sectional (secondary analysis)	Data from the 'health interview' in the 'Second Dutch national survey of general practice' was combined with 2 other datasets from the 'Dutch housing demand survey' (WBO, 1998 and WoON, 2002). Register information collected by Statistics Netherlands (1995-1999) was also used. 44.5% male and 55.5% female	Health interview: random sample of patients WBO: stratified/random WoON: stratified/random	9,253 (in 672 postcode units)	Weekly alcohol consumption: glasses per week (alcohol intake during the week and during the weekend assessed separately and then summed to generate a weekly estimate). Participants categorised as no intake (or almost none), moderate intake and high intake	Neighbourhood social capital (from the WBO, 1998 survey): 3 items: (1) whether people in the neighbourhood know each other, (2) whether neighbours are nice to each other, and (3) whether there is a friendly and sociable atmosphere in the neighbourhood Analysed at neighbourhood-level, as aggregated mean scores	Multilevel logistic regression Multilevel mediation analysis via the Sobel test Controlled for sex, age, education, income, employment status, home ownership, and years of residence at individual-level Controlled for income, urban density, and home maintenance at neighbourhood-level	No significant association between neighbourhood social capital and moderate alcohol intake

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
Ng Fat	2017	To establish how individual social capital affects drinking pattern among men and women in England and whether social capital alters the relationship between area-deprivation and drinking pattern	England	Cross-sectional (secondary analysis)	Participants from the Health Survey for England (HSE) 2002–2006 with data on drinking status 44.4% male and 55.6% female	Multistage stratified probability sampling	54,422 (from 2,467 primary sampling units)	Drinker status: “Do you ever drink alcohol nowadays?” (yes/no) Heavy episodic drinking (past week): more than 8 units for men and 6 units for women on the heaviest drinking day in the past week At least 2 drink-free days (past week): yes/no	Perceived neighbourhood social cohesion (e.g. “this area is a place where neighbours look after each other”) Analysed at individual-level Multilevel logistic regression Neighbourhood cohesion measured and analysed at individual-level. Non-response weights.	Adjusted for economic activity, highest educational qualification, ethnicity, longstanding illness, marital status, children in the household, area deprivation, social trust, civic participation, social support 	

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
Pavlova	2014	To investigate the individual-level relationships between formal and informal social participation, emotional well-being, and risky alcohol consumption	Poland	Cross-sectional (secondary analysis)	Participants aged 16-46 from the Polish replication of the Jena Study on Social Change and Human Development 49.3% female and 50.7% male	Random stratified	2,970 (from two Eastern and two Western provinces)	Risky alcohol consumption (past year): approximate number of times being really drunk in the past year	Frequency of joint activities with friends and neighbours ("How often do you engage in joint activities with friends and acquaintances from the place where you live?") Assessed and analysed at individual-level	Hierarchical multiple regression and zero-inflated Poisson regression Controlled for demographic variables, socioeconomic status, employment and partnership status, general health, physical impairment, religiosity, generalised trust, and social participation indicators.	Joint activities with friends and neighbours from the local area predicted having been really drunk at least once in the past year, Exp(B) = 1.495, 95 % CI [1.266, 1.766] but was not associated with frequency of being really drunk in the past year.
Perez	2022	To examine changes in neighbourhood social environment attributes between late adolescence and emerging adulthood in relation to multiple alcohol and marijuana use outcomes in emerging adulthood.	USA	Secondary analysis of longitudinal data	Participants from Wave 6 (late adolescence) and Wave 12 (emerging adulthood) of a longitudinal cohort study that recruited middle school students for a school-based substance use prevention intervention 44% male and 56% female at Wave 12	Not reported	1,249	Alcohol use (past month): number of days in which alcohol was consumed Solitary alcohol use (ever): yes/no	(Change in) perceived neighbourhood social cohesion: 4 items from the Social Cohesion Scale (neighbours willing to help, can be trusted, do not get along, do not share the same values) (Change in) perceived substance use problems in the neighbourhood: 3 items assessing extent that participants agree alcohol, smoking or drug use amongst youth is a problem in the neighbourhood	Negative binomial for analysing alcohol use Logistic regressions for analysing solitary alcohol use Controlled for baseline neighbourhood scores, baseline past-month alcohol or marijuana use, socio-demographics, depressive symptoms, and mover status	Compared to no change, increasing social cohesion associated with lower odds of solitary drinking (OR = 0.60, 95% CI: 0.41-0.87) Compared to no change, no significant association between decreasing social cohesion and solitary drinking. No significant association between change in social cohesion and alcohol use. No significant interaction between change in social cohesion and mover status with regards to alcohol outcomes

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
									Assessed and analysed at individual-level		No significant associations between change in neighbourhood substance use problems and either alcohol outcome No significant interaction between change in neighbourhood substance use problems and mover status with regards to alcohol outcomes
Ruiz	2019	To compare the prospective association between perceived neighbourhood social cohesion and depressive symptoms among older adults in England and the Czech Republic, Russia and Poland; and examine whether psychological and health behavioural pathways mediate this association	England, the Czech Republic, Poland	Secondary longitudinal analysis of longitudinal data	Two population-based European prospective cohort studies: The English Longitudinal Study of Ageing (ELSA) (England), and the Health, Alcohol and Psychosocial factors In Eastern Europe (HAPIEE) study (Czech Republic [CZ], Russia [RU] and Poland [PO]), which all recruited older adults (50+ for ELSA, 45-69 for HAPIEE)	Randomly selected from population registers (except for ELSA)	26,081	Annual drinking frequency: grams of ethanol (gender-specific thresholds) Annual binge drinking frequency: frequency; 5 ≥ drinks in 1 day classed as binge drinking	Perceived neighbourhood social cohesion (2 items assessing interpersonal trust and help from neighbours. There were slight differences in the phrasing of these questions across the study populations) Individual-level	Multivariable negative binomial regression Models fitted in each country sample Path modelling Adjusted for age (years), gender, educational attainment, marital status, self-rated health, number of limitations in ADLs and probable depression (all at baseline)	Significant negative association between neighbourhood cohesion and drinking frequency in HAPIEE-PO and ELSA but no/weak association with social cohesion in HAPIEE-CZ Significant negative association between neighbourhood cohesion and binge drinking in HAPIEE-PO and HAPIEE-CZ but not ELSA. Significant negative association between neighbourhood cohesion and drinking volume in HAPIEE-PO only. (Findings from HAPIEE-RU are not presented here because they do not meet the review's eligibility criteria)

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
Seid	2016	To examine the effect of social interactions and generalised trust on drinking in the general Danish population survey	Denmark	Cross-sectional (secondary analysis)	A representative sample of the Danish population aged 16-79 who took part in the 2011 Danish alcohol and drug survey Gender distribution not reported	Randomly selected using the central person registry (CPR) as a sampling frame	2,569	Heavy episodic drinking (HED; past year): five or more units on one occasion in the previous 12 months (analysed as binary variable, i.e. yes/no)	Social interaction: with male/female friends, colleagues Social support: 'How easy or difficult is it to get help from friends if you need it?' Social participation: 'Are you a member of an organisation, club, or other organisations?' Trust: 'To what extent do you trust most people?' Analysed at individual-level and neighbourhood-level (postcode units) Note that only neighbourhood-level findings are reported because items do not relate specifically to the neighbourhood environment	Multivariate logistic regression to investigate associations with HED Controlled for age, gender, personal annual income, education, employment status, marital status, living with children	Multivariate logistic regression (neighbourhood-level findings): HED not associated with social interaction, social participation, or trust. Negative association between community-level social support and HED (0.6% point reduction in HED with a 10% point increase in social support)
Studer <i>*Overlaps with Dupuis et</i>	2016	To investigate the associations of risky use of alcohol, cigarette and cannabis with PP toward misconduct, toward peer involvement and toward	Switzerland	Secondary cross-sectional analysis of longitudinal data	Data from the follow-up survey (completed January 2012 - March 2014) only from the C-SURF	"...virtually the entire Swiss male population in this age group was	5,680	Frequency of risky single occasion drinking: RSOD; 6+	Neighbourhood cohesion (assessed using a modified version of the Perceived Neighbourhood	Multinomial logistic regressions Adjusted for socio-demographics, peer pressure towards	Significant moderating effect of neighbourhood cohesion on the relationship between peer pressure towards misconduct and

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
al (2016) and Tsai et al (2020)		peer conformity and to examine whether the associations between risky substance use and PP toward misconduct were moderated by social resources, namely neighbourhood cohesion, SS, PP toward peer involvement and toward peer conformity			100% male	eligible for inclusion in C-SURF" (Tsai et al, 2020, p.2)		drinks on the same occasion	Social Cohesion Questionnaire, P-NSC) (16 items assessing 3 dimensions: trust, attachment, tolerance) Measured and analysed at individual-level	peer involvement, peer pressure towards peer conformity, social support from friends, and social support from a significant. Tested the moderating effect of neighbourhood cohesion on peer pressure towards misconduct and substance abuse outcomes. Tested significant interactions.	monthly/at-least weekly RSOD Model 3: neighbourhood cohesion moderates (significantly) the relationship between peer pressure towards misconduct and at-least monthly RSOD High neighbourhood cohesion associated with increased odds of RSOD (OR = 1.10, 95% CI: 1.03-1.18) and at-least weekly RSOD (OR = 1.13, 95% CI: 1.05-1.22) in fully adjusted model
Tamura	2020	To analyse associations between each neighbourhood social environment feature (i.e., violence, problems, and social cohesion) and depressive symptoms among Jackson Heart Study participants (stratified by age and sex), and to test for the degree to which associations between each neighbourhood social factor and depressive symptoms are mediated by total physical activity	USA	Secondary cross-sectional analysis of longitudinal data	A sample of African-American adults from Jackson, Mississippi, drawn from the Jackson Heart Study - Exam 1 (2000-2004), and who have complete data for depression/psychosocial/neighbourhood measures 36% male and 64% female	JHS used multiple recruitment methods: participants drawn from another longitudinal study (Atherosclerosis Risk in Communities, ARIC, study), random sampling, volunteer sampling, family sampling (genetically-related family members of participants)	2,209	Alcohol use (past year): Yes/no	Neighbourhood social cohesion (5 items e.g. trust in neighbours, willingness to help) Aggregated to census tract level	Multilevel modelling Age-adjusted and fully adjusted models Controlled for age, sex, high school graduation, household income, BMI, total PA, smoking status, alcohol use, walking limitation, history of a medical condition, lifetime discrimination, daily discrimination, burden of lifetime discrimination, chronic stress, weekly stress, and population density	No significant association between neighbourhood social cohesion and alcohol use ($p = .0167$) (i.e., no difference in being a drinker in the last year between high and low social cohesion groups)

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
						from the other samples)					
Tsai <i>*Overlaps with Dupuis et al (2016)</i>	2020	To examine cross-sectional and longitudinal associations between social cohesion, depression and problematic substance use among young men, age 21–25	Switzerland	Secondary longitudinal analysis of longitudinal data	(Male) participants that responded to both the second and third waves of the Swiss Cohort Study on Substance Use Risk Factors (C-SURF) 100% male Enrolment: August 2010-November 2011 Baseline questionnaire: September 2010-March 2012 t1: March 2012-January 2014 t2: April 2016-March 2018	"virtually the entire Swiss male population in this age group was eligible for inclusion in C-SURF" (p.2)	5,372	Alcohol use disorder (past year): 12 questions relating to alcohol use dependence severity in line with DSM-V symptoms	Neighbourhood social cohesion (16 items at timepoint 1 and 9 items at timepoint 2 assessing 3 cognitive aspects: trust, attachment, tolerance) Measured and analysed at individual-level	Path models and structural equation models Mediator analyses	No significant direct effect of neighbourhood cohesion on AUD Significant indirect (negative) effect of social cohesion on AUD via depression
Tucker	2021	To examine associations of neighbourhood and network indicators of social capital with past month binge drinking (any, frequency) in a nationally representative U.S. sample of adults	USA	Cross-sectional (secondary analysis)	Adults aged 30-80 from the RAND American Life Panel (ALP), a nationally representative internet panel of US adults 44% male and 56% female	Random sample of a probability-based panel study	1,383	Binge drinking (past month): number of days participant consumed 4 or 5 drinks in a row, for women and men respectively	Neighbourhood social cohesion: 4 items (willing to help neighbours, look out for one another, can be trusted, get along with each other) Analysed at individual-level	Zero-inflated negative binomial regressions Model 1: sociodemographic and socioeconomic factors and neighbourhood social capital Model 2: adds network social capital Model 3: adds interactions of age with social capital variables Analyses weighted according to US	In both models 1 and 2, higher neighbourhood cohesion negatively associated with being a binge drinker (model 1: OR = 0.63, 95% CI: 0.42-0.92; <i>b</i> = -0.47, SE = 0.20; <i>p</i> < .05. Model 2: OR = 0.53, 95% CI: 0.35-0.80; <i>b</i> = -0.63, SE = 0.21; <i>p</i> < .01.) but not significantly associated with binge drinking frequency. Age did not moderate the association between neighbourhood social

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
										population demographic distributions	cohesion and binge drinking
Villalonga-Olives	2020	To investigate whether there is a decrease in the trend of binge drinking in older adults and if neighbourhood social cohesion and positive social support act as protective influences, while neighbourhood physical disorder and negative social support act as risk factors	USA	Secondary longitudinal analysis of longitudinal data	Older adults from five waves of the Health and Retirement Study (HRS) panel data from 2006-2014 (combined into 3 waves due to different assessment periods) Approx. 41% male and 59% female at all three waves	Multistage area probability sample of households	19,140	Binge drinking (past 3 months): "In the last three months, on how many days have you had four or more drinks on one occasion?" (scores range from 0-92)	Neighbourhood social cohesion as a domain of SC (3 items – people would help, most people can be trusted, most people are friendly) Individual-level	Multilevel structural equation modelling (assessment level, i.e. within-person effects; and person level, i.e. between-person effects) with random intercepts Adjusted for age, gender, educational attainment and race/ethnicity Analyses stratified by gender	Protective effects of neighbourhood cohesion on binge drinking for females
Vincent	2023	To assess the extent to which resilience and social capital buffered against the effects of racial discrimination, a social structural stressor, on alcohol-related sexual behaviour that could contribute to HIV and sexually transmitted infection (STI) transmission	USA	Cross-sectional	Black cisgender, heterosexual males aged 18-44 in Washington, DC who were part of a larger mixed-methods study of neighbourhood contexts and sexual HIV risk behaviours 100% male	Random sampling of addresses from US census blocks that were at least 40% black	595 <i>(analysis was based on 530 participants due to listwise deletion for handling missing data)</i>	Binge drinking (past month): "During the past 30 days, on how many days did you have five or more drinks of alcohol in a row, within a couple of hours?"	Neighbourhood social capital: 9 sub-scale items from the Collective Efficacy Scale assessing sense of community, social support and trust in one's neighbourhood. E.g. "Do people in your neighbourhood get along well?" Neighbourhood-level (clustered at census tracts)	Regression-based path analysis	No significant direct effect of neighbourhood social capital on binge drinking
Wang	2017	To examine the associations of neighbourhood social context with health behaviours over a median of 8 years of follow-up	USA	Secondary longitudinal analysis of longitudinal data	African-American adults 35–84 residing in the Jackson, MS tri-county area who participated in the Jackson Heart Study (a cohort	Multistage probability sampling	3,166 (in 108 census tracts)	Alcohol use (past year): "On average, on the days that you drank alcohol how many drinks did you have a day?" (alcohol	Neighbourhood social cohesion: 5 items (close-knit neighbourhood, neighbours willing to help, neighbours do not get along,	Multinomial logistic regression Adjusted for individual-level sociodemographic and socioeconomic factors	Model 1: At visit 1, social cohesion negatively associated with heavy drinking (compared to moderate drinkers: OR = 0.87, 95% CI: 0.79-0.97) but not never drinking.

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
					study of African Americans investigating cardiovascular disease). Analysis relates to baseline visit and two follow-up visits. 36% male and 64% female			use categorised as 'none', 'moderate' or 'heavy' according to CDC classification, which defines heavy drinking as >1 drink per day for women and >2 drinks per day for men) Long-term alcohol behaviour was classified as "moderate/none, consistent", "heavy to moderate/none", "moderate/none to heavy", or "heavy, consistent"	neighbours can be trusted, neighbours do not share the same values) Analysed at neighbourhood-level	Model 1: adjusted for age at first visit and sex only Model 2: further adjusted for other individual socioeconomic factors	Social cohesion negatively associated with "heavy, consistent" drinking (OR = 0.85, 95% CI: 0.74-0.96) Model 2: Neighbourhood social cohesion not associated with alcohol use
Yang	2022	To investigate whether two psychosocial correlates—parental psychological control and perceived social capital—are associated with substance use and DUI among college students and whether there are sex differences in these associations	USA	Cross-sectional	Emerging adults (aged 18-25) studying psychology at a public university 34% male and 66% female	Opportunity sample	726	Binge drinking: 4+ or 5+ drinks in a row for females and males respectively	Perceived social capital: 4-item Cognitive Social Capital scale (e.g. <i>"In general, the majority of people in my community can be trusted"</i> and <i>"I feel as though I am really a part of my community"</i>) Individual-level	Standard Poisson models Multigroup analyses with maximum likelihood estimation for gender-specific associations Controlled for age, race, and family structure	Perceived social capital negatively associated with incident rate ratios (IRR) of binge drinking for men (IRR = 0.99, 95%CI [0.980, 1.000]) and women (IRR = 0.98, 95% CI [0.972, 0.988]) No interaction between maternal psychological control and perceived social capital in relation to binge drinking. Significant interaction between paternal psychological control and perceived social capital amongst males.

First author	Year	Aim(s)	Country	Design	Sample	Sampling method	Sample size	Alcohol variable	Neighbourhood variable	Analytic approach	Summary of findings
											The strength of the association between paternal control and binge drinking increased as the perception of social capital increased.

4.4.3. Empirical studies: characteristics and summary of findings

4.4.3.1. *Characteristics of empirical studies*

A total of 26 empirical studies were included in this review and are summarised in Table 5. The samples analysed in several studies overlapped but were retained since no quantitative analysis was conducted for this review. This includes: three Swiss studies that used the Cohort Study on Substance Use Risk Factors (C-SURF); three US studies that used the New York Social Environment Study (NYSES); three Dutch studies that used the Netherlands Housing Survey (WoON); two US studies that used the Jackson Heart Study (JHS); two US studies that used the Health and Retirement Study (HRS); and two Dutch studies that used the National Integrated Survey on Living Conditions (POLS).

Most studies were secondary cross-sectional ($n=17$) or longitudinal ($n=6$) analyses of larger, representative datasets. One other study reported both cross-sectional and longitudinal findings based on secondary data. The remaining two studies were cross-sectional and used random sampling (Vincent et al, 2023), or opportunity sampling (Yang et al, 2022). Sample sizes ranged between 595 and 54,422 participants, which were drawn from a wide range of study locations, including the US ($n=11$), Switzerland ($n=3$), the Netherlands ($n=3$), the UK ($n=2$), Finland ($n=1$), Poland ($n=1$), Denmark ($n=1$), New Zealand ($n=1$), Sweden ($n=1$), and multiple European countries ($n=2$). Most studies were based on adults drawn from the general population ($n=14$), while fewer studies analysed sub-populations such as older adults ($n=3$), young Swiss males ($n=3$), specific ethnic groups ($n=3$), emerging adults ($n=2$), or a specific cohort that experienced unique social and cultural changes ($n=1$). Alcohol use was examined using various tools that assessed quantity/frequency of consumption over a given period, binge drinking, AUD prevalence and severity, drinker status as a binary variable, drink-free days, hazardous drinking, frequency of intoxication, and solitary drinking. Most studies used a single measure of alcohol use ($n=21$) while the remainder of studies used several of these measures ($n=5$). Binge drinking (also described as HED and RSOD) was the most commonly used measure of alcohol use across all of the included studies, with 9 of the 21 studies that used a single measure of alcohol use focusing on binge drinking only.

Fourteen studies analysed only individual-level NSC, eight studies analysed only contextual-level NSC, and one study conducted analyses that examined both individual- and contextual-level NSC as predictors of alcohol use. A further two studies analysed only neighbourhood drinking norms as a contextual-level factor and one additional multilevel study reported on

both collective efficacy and neighbourhood drinking norms. Multilevel studies aggregated neighbourhood measures to different types of spatial units, including postcodes (n=4), census area units or tracts (n=4), community districts (n=3), and urban areas (n=1). Four studies used single-item measures to assess specific aspects of NSC and 17 studies used between two and 16 items to assess NSC as a composite variable. Another two studies measured NSC as a composite variable but also reported associations between specific NSC indicators and alcohol use.

Tools/instruments used to assess NSC as a composite variable tapped into a range of indicators, including: perception of the neighbourhood as “close-knit”; trust amongst neighbours; shared values; tolerance and respect; sense of belonging and attachment to the neighbourhood; extent of social contact with neighbours; membership in neighbourhood groups; whether neighbours are friendly and get along; and if neighbours help each other or would help in an emergency. Collective efficacy was conceptualised and operationalised as a composite of neighbourhood social cohesion and (informal) social control. Informal social control was consistently measured using five items relating to the perceived likelihood of neighbours intervening in children’s deviant activity (i.e., skipping school, spray painting graffiti, disrespecting an adult), a person being threatened or attacked, and whether the community would work together to prevent the closure of a fire station. Neighbourhood drinking norms were measured as acceptability of alcohol use. Three items pertaining to alcohol, smoking and drug use amongst neighbourhood youth were used to assess perceived substance use problems in the neighbourhood.

4.4.3.2. Summary of findings from empirical studies

Overall findings from individual-level and multilevel analyses

There were mixed findings regarding associations between neighbourhood social cohesion and alcohol use in both individual-level and multilevel analyses.

In individual-level analyses, when significant relationships were reported, there was a tendency for studies to report that higher NSC was negatively associated with alcohol outcomes. In these studies, NSC was protective against binge drinking (Ruiz et al, 2019; Tucker et al, 2021; Villalonga-Olives et al, 2020; Yang et al, 2022), problem drinking (Borgonovi, 2010; Larm et al, 2016; Nordmyr et al, 2016), alcohol dependence (Dupuis et al, 2016), drinking quantity (Lin et al, 2012), drinking frequency among women (Ng Fat et al,

2017), and solitary alcohol use (Perez et al, 2022). Three studies reported positive associations between NSC and binge drinking (Dupuis et al, 2016; Kim et al, 2020; Studer et al, 2016) while other studies reported positive associations of NSC with drinking frequency (Lin et al, 2012), drinker status amongst men (Ng Fat et al, 2017), and past-year intoxication (Pavlova et al, 2014). Some studies indicated that the relationship between NSC and alcohol use depended on how drinking was assessed as they reported mixed findings when using different alcohol assessment tools (Dupuis et al, 2016; Lin et al, 2012; Ng Fat et al, 2017; Pavlova et al, 2014; Tucker et al, 2021). For example, one study found that higher levels of NSC were linked to binge drinking and alcohol use but were protective against pathological drinking patterns (i.e., prevalence and severity of dependence) (Dupuis et al, 2016). Similarly, another study found NSC to be positively associated with drinking frequency but negatively associated with drinking quantity (Lin et al, 2012). One study reported that NSC was negatively associated with binge drinking but not binge drinking frequency (Tucker et al, 2021), while another reported that social interaction with others from the local area was positively associated with being drunk in the past year but not frequency of being drunk (Pavlova et al, 2014). One study reported no association between individual-level NSC and AUD (Tsai et al, 2020), while another study reported no association between social trust and alcohol abuse for participants at age 34 in the Birth Cohort Study but also reported a negative association for participants aged 46 in the National Child Development Study (Borgonovi, 2010). A large secondary analysis of two population-based cohort studies spanning across four countries reported mixed findings between the study locations (Ruiz et al, 2019). In England and Poland, lower social cohesion was significantly associated with a higher drinking frequency, but weak/no relationship was found in the Czech datasets (Ruiz et al, 2019). Although Ruiz and colleagues (2019) did not propose an explanation for these cross-cultural differences, they suggested that social norms may play a role in the significant associations between social cohesion and alcohol use. The one study that examined the role of perceived substance use problems in the neighbourhood found no significant associations with alcohol outcomes (Perez et al, 2022).

Multilevel analyses also demonstrated mixed results, but these studies most often indicated no significant contextual effect of NSC or CE on alcohol outcomes such as binge drinking (Chauhan et al, 2016; de Gelder et al, 2017; Vincent et al, 2023), drinking quantity and/or frequency (Lin et al, 2012; Mohnen et al, 2012), drinker status (Tamura et al, 2020), and heavy drinking (Wang et al, 2017). Two Dutch studies found positive associations between NSC and alcohol outcomes, whereby one study reported a positive association between NSC and binge drinking but not chronic heavy drinking (Kuipers et al, 2013) and another study indicated a non-linear relationship whereby moderate cohesion was associated with elevated rates of

hazardous drinking in men (Kuipers et al, 2012). One study reported that social support was negatively associated with binge drinking but no other neighbourhood social factors were linked to alcohol use (Seid et al, 2016). Two of the three studies that assessed neighbourhood drinking norms found positive associations between permissive norms and alcohol outcomes, including AUD (Ahern et al, 2015) and binge drinking (Chauhan et al, 2016). The third study found no association between neighbourhood drinking norms and alcohol use (Lê et al, 2010).

Comparing results from studies of structural versus cognitive NSC domains

When structural domains of NSC (i.e., membership in neighbourhood groups, civic participation, permissive neighbourhood drinking norms) were assessed, positive associations with alcohol outcomes such as binge drinking (Chauhan et al, 2016), AUD (Ahern et al, 2015), and past-year heavy intoxication (Pavlova et al, 2014) were more often reported. One study found less frequent contact with neighbours was linked to problematic alcohol use after controlling for individual sociodemographic factors and structural aspects of social ties (e.g. social contact with friends or neighbours) but not after further adjustment for functional aspects (e.g. loneliness, neighbourhood trust; Nordmyr et al, 2016). Two studies found no significant association of structural NSC, measured as neighbourhood drinking norms (Lê et al, 2010) and social interaction and participation (Seid et al, 2016), with alcohol outcomes.

Composite measures of NSC and collective efficacy were indicative of cognitive NSC if they did not include items relating to structural components such as contact with neighbours. When cognitive domains of NSC (i.e., composite NSC, neighbourhood trust) were measured, studies generally reported either no association (Chauhan et al, 2016; de Gelder et al, 2017; Tamura et al, 2020; Tsai et al, 2020; Wang et al, 2017) or a protective effect (Ruiz et al, 2019; Villalonga-Olives et al, 2020; Yang et al, 2022) of the neighbourhood factor on alcohol outcomes. Besides one study reporting a clear positive association between composite NSC and binge drinking (Studer et al, 2016), the other findings regarding cognitive NSC and alcohol outcomes were mixed (Dupuis et al, 2016; Lin et al, 2012; Ng Fat et al, 2017; Perez et al, 2022; Tucker et al, 2021). When specific indicators of cognitive NSC (e.g. trust, respect, perceived social support) rather than composite measures were investigated, they were typically negatively associated with alcohol outcomes such as binge drinking (Seid et al, 2016), alcohol abuse (Borgonovi, 2010), hazardous or problem drinking (Larm et al, 2016; Nordmyr et al, 2016) and AUD (Dupuis et al, 2016). One study also found that generalised trust aggregated to the neighbourhood level was not associated with binge drinking (Seid et al, 2016), while another study found that individual-level neighbourhood-specific trust was not

associated with alcohol abuse (Borgonovi, 2010). Only one study reported a positive association between a specific indicator of NSC (i.e., neighbourhood trust) and alcohol outcomes (Dupuis et al, 2016).

Summary of relevant interaction effects

Several studies investigated interactions between neighbourhood social factors and other variables in relation to individual alcohol use. A Finnish study reported that neighbourhood trust interacted with age group and language group to influence the odds of problem drinking (Nordmyr et al, 2016). However, other studies reported that neighbourhood factors did not interact with individual sociodemographic characteristics in relation to alcohol outcomes. One Swedish study reported no interactions between neighbourhood trust, sense of coherence and sex (Larm et al, 2016), while a US study reported that age did not moderate the relationship between NSC and binge drinking (Tucker et al, 2021). In multilevel analyses, Chauhan et al (2016) found no interaction between ethnicity and neighbourhood drinking norms, nor with collective efficacy, but found a significant interaction between ethnicity and neighbourhood drinking norms at individual-level. Three multilevel studies examined possible interactive effects of neighbourhood social factors and neighbourhood socioeconomic or built factors. A Dutch study found that NSC slightly weakens the relationship between neighbourhood deprivation and heavy drinking (Kuipers et al, 2013). Analyses of adults from the New York Social Environment Study found there was no additive interaction of outlet density and neighbourhood drinking norms in relation to AUD (Ahern et al, 2015), and neighbourhood drinking norms did not mediate the association between neighbourhood-level education inequality and alcohol use (Lê et al, 2010). Two studies of emerging adults reported that moving out of the neighbourhood did not interact with NSC or perceived neighbourhood substance use problems (Perez et al, 2022) but that paternal psychological control interacted with NSC amongst males only (Yang et al, 2022). Maternal psychological control did not interact with NSC to influence (binge) drinking for males or females (Yang et al, 2022). In two Swiss studies using participants from the same dataset, Studer et al (2016) reported a moderating effect of NSC on the relationship between peer pressure towards misconduct and binge drinking whereas Tsai et al (2020) reported that NSC indirectly affects AUD via depression.

Some studies found differences in the relationship between NSC and alcohol use according to gender. These studies found that NSC had a protective effect on drinking frequency (Ng Fat et al, 2017), hazardous drinking (Larm et al, 2016), and binge drinking (Villalonga-Olives

et al, 2020) in women, but had no association (Larm et al, 2016) or increased the odds of being a drinker for men (Ng Fat et al, 2017). Kuipers et al (2012) specified that only moderate NSC increased the odds of hazardous drinking for men. A sex-stratified examination of emerging adults reported that NSC reduced the risk of binge drinking for both males and females (Yang et al, 2022). Four studies included only male participants. Three of these studies used respondents from the same Swiss dataset and found a promotive effect of individual-level NSC on binge drinking (Dupuis et al, 2016; Studer et al, 2016) but a protective effect (Dupuis et al, 2016) or no effect (Tsai et al, 2020) on AUD. The fourth study found no effect of contextual NSC on binge drinking (Vincent et al, 2023).

4.4.4. Quality assessment

Nineteen quantitative studies were assessed using the modified version of N-OS for cross-sectional studies (Modesti et al, 2016), which was further adapted for the purpose of this review. All of these studies were rated as high quality (i.e., >66%), except for one study (de Gelder et al, 2017), which was rated as medium quality. However, few studies (n=4) used validated tools to assess alcohol use. Where stars were lost, this was mainly due to item 3 (reporting of response rate and/or how responders differed from non-responders), item 4 (use of validated measure of neighbourhood factor), and item 7 (using a validated measure of alcohol use). All studies had adequate sample sizes and included important sociodemographic and contextual covariates in their analyses. The quality of the seven remaining quantitative articles that used longitudinal designs were assessed with the N-OS version for cohort studies. Based on tertiles, five studies were rated as high quality and two studies were rated as medium quality. All studies lost one star because the outcome (i.e., alcohol use) was not assessed using a validated tool, and six of the seven studies lost an additional star because the neighbourhood factor was assessed via written self-report rather than interviews. Further details regarding quality assessment are provided in Appendix 3.

4.5. Narrative summary of conceptual framework

This review did not focus on material deprivation or the built environment and so these factors are not encompassed in the framework. However, it is important to note that neighbourhood socioeconomic resources and level of (dis)advantage are important macro-level factors that contribute to the development of positive neighbourhood social environments and have important implications for the processes illustrated in Figure 4. Macro-level factors such as

poverty and material deprivation can moderate neighbourhood effects on behaviour and development of normative practices (e.g. by impeding the ability of residents to impose negative sanctions on others who violate norms; or through reduced access to facilities supporting health improvement, rehabilitation and recreation). Given the focus on neighbourhood characteristics, explanations of associations between individual sociodemographic factors and alcohol use were also omitted. However, certain aspects of the pathways outlined in this section are likely to be more influential for different groups (e.g., males more than females, older residents more than younger). For example, norms of masculinity (Vaeth et al, 2015; Vincent et al, 2023) and stigmatisation of women's alcohol use (Woodall & Boeri, 2014) may help explain alcohol use disparities. Experiences of NSC may also be gendered as females may derive more emotional support through the local area and thus have different drinking motives to males (Yang et al, 2022), who may be more susceptible to home and peer influences than wider neighbourhood influences (Magson et al, 2016).

The theoretical framework was developed based on analysis of the theory papers and consists of three distinct but related pathways that demonstrate how NSC influences individual alcohol use. Key theories or models that were cited in the theory papers and which informed the development of the framework are briefly summarised in Table 6. In the conceptual framework (Figure 4), the pathways are represented by rectangular boxes and include influences via: (1) social control and norms, (2) psychosocial processes, and (3) diffusion of information, resources and support. Each pathway has multiple aspects (i.e., sub-themes, as derived from thematic analysis) that help to elucidate the theorised mechanisms linking NSC to individual alcohol use according to each pathway. These aspects are represented by blue or purple ovals in the diagram. Blue ovals with thin borders indicate mechanisms that directly influence alcohol use, while purple ovals with thick borders indicate where mental health is implicated. In most cases, it is theorised that low NSC worsens mental health, which promotes drinking to cope. There was also limited evidence suggesting that high NSC can be detrimental to mental health – particularly in low-resource neighbourhoods, when individuals feel burdened by the sense of obligation to support others (Pavlova et al, 2014) or when one has access to negative forms of NSC (particularly structural aspects) that may promote heavy drinking norms, risk of relapse or depressive symptoms (Weston et al, 2018). Reverse causation was also acknowledged in some papers, which suggested that poor mental health leads to worse perceptions of NSC, which can exacerbate mental health issues and/or alcohol consumption (McLeish et al, 2023; Smith et al, 2023; Weston et al, 2018).

Table 6 - Summary of key theories that informed the development of the conceptual framework

'Named' theory	Description	Pathways
Diffusion of innovations theory (Rogers, 1995)	Higher NSC promotes more efficient diffusion of health-related information and resources throughout a neighbourhood. Residents who spend more time interacting in the neighbourhood environment and who are more socially connected are likely to be among the earliest to adopt new alcohol-related knowledge or drinking practices.	3
Folland's model (Folland, Kaarbøe & Islam, 2014)	Building NSC requires an investment of time and therefore involves a risk-reward appraisal that determines residents' leisure choices. The potential for NSC to enhance survival can promote health-damaging behaviours such as alcohol use as it extends the window within which individuals can enjoy drinking.	1
Miniaturisation of community (Lindström, 2003; Fukuyama, 1999)	Miniaturisation of community occurs when residents have low trust and high social participation in their neighbourhoods – the opposite of “traditionalism” (high trust and low participation). Residents may adopt the drinking norms of a neighbourhood or subculture within it with little exposure to (and influence from) the wider society.	2, 3
Self-categorisation theory / social identity theory (Tajfel & Turner, 1979; Turner et al, 1987)	Residents who value and collectively identify with the neighbourhood are more likely to adopt drinking practices aligned with the neighbourhood norms. Individuals may also come to identify with and assume membership in a group (e.g. neighbourhood/community) when they perceive themselves to be similar to other members. Residents who do not belong to these groups may face stigma, exclusion, and marginalisation, which can worsen alcohol-related problems.	1, 2
Social cognitive theory / social learning theory (Bandura & Walters, 1977; Bandura, 2001)	Drinking behaviours are learned through observation and modelling of alcohol consumption in the neighbourhood social environment, the role of NSC in promoting self-efficacy with regards to controlling drinking behaviours, and positive reinforcement of drinking practices. When drinking behaviours are acceptable and visible, residents are likely to conform to neighbourhood drinking norms.	1, 2
Social control theory (Hirschi, 1969)	Strong bonds in the neighbourhood social context and attachment to neighbourhood groups – key aspects of NSC – deter engagement in 'deviant' behaviour, which may include alcohol consumption practices.	2

4.5.1. Pathway 1: Psychosocial processes

1a. Self-perceptions, sense of purpose and meaning

Socialising with others promotes a sense of belonging and can help build positive self-perceptions, which in turn can promote further social activity. Neighbourhood social capital also enables individuals to foster psychosocial competencies such as self-efficacy, self-acceptance, and self-esteem (Alcalá et al, 2016; Boucher et al, 2017; Morse et al, 2015;

Nieminen et al, 2013; Samuel et al, 2013; Tsai et al, 2020; Vigdal et al, 2022), which better equip individuals to manage stress, lessening the need to use alcohol to cope. Among individuals in recovery, these psychosocial processes also assist a transformation of social identity away from stigmatised alcohol-related identities, whereby “trying something new” can help individuals to better integrate into the wider neighbourhood social context (Morse et al, 2015), which can contribute to achieving “self-actualisation” (Robertson, Hoek & Blank, 2022). Self-perceptions (i.e., self-efficacy, self-control, self-esteem) determine how an individual copes with stress and trauma, and whether one perceives they can cope without using alcohol. These factors also enable individuals to set and achieve goals regarding their drinking.

Finding meaning in life and (re-)integrating into society are defining features of recovery from alcohol problems (Bahl et al, 2019; Bahl et al, 2023; Eng, 2020). Neighbourhood social and civic engagement can provide residents with opportunities to engage in meaningful activities that do not involve drinking and “give back” to society (Best et al, 2022; Fomiatti, 2020; Morton, O'Reilly & O'Brien, 2016; Vigdal et al, 2022) – the latter of which is an especially prominent aspect of recovery narratives. Neighbourhood interactions that facilitate a sense of purpose and meaning in life can help individuals to develop routines that are not compatible with problematic drinking (Nieminen et al, 2013). For example, voluntary work can help an individual to feel like they can positively contribute to society and thus remain connected to the wider community, and this activity is unlikely to be fulfilled effectively during periods of intoxication. Feeling needed and valued in the neighbourhood is described as “the opposite of being stigmatised” (Vigdal et al, 2022, p. 985), and maintenance of these activities can lead to alcohol being a less salient aspect of day to day life.

1b. Time perspectives, future prospects, and motivation to protect health

The mechanism “time perspectives” was inferred from the available information via latent coding. Social capital is theorised to improve life expectancy (Islam et al, 2017) and is conceptualised as a “leisure choice” – requiring an investment of time in Folland’s model (cited in Islam et al, 2017). Islam et al (2017) cites two contrasting implications of this. The first is that increased NSC can decrease alcohol use when drinking confers a higher risk of death. This may be due to the sense of belonging afforded by NSC and perception that one is needed and valued by other residents, which motivates health protection (e.g. lower alcohol consumption) so that one can make positive contributions to the community’s benefit. The second implication of Folland’s model is that alcohol use may increase with social capital gains since the prospect of extended survival means that an individual has a larger temporal window

within which they can drink. In one article, social connection with other drinkers “served a basic survival function” among disadvantaged street drinkers (Manton et al, 2014). For current drinkers, the benefits of NSC with regards to an individual’s outlook on life may diminish one’s perception of the risks of drinking because they do not face negative social consequences that prompt consideration of health-behavioural changes – especially when they are seen to drink in accordance with neighbourhood drinking norms. Drawing on evolutionary psychology, it may be adaptive for people in unpredictable neighbourhoods to adopt present-oriented thinking because residents may have “more immediate concerns” (Rachele et al, 2016, p. 98) (e.g. maintaining safety, protecting their kin, obtaining their basic resources) than addressing alcohol use problems and maintaining healthful behaviours. Socio-structural neighbourhood factors determine one’s life chances (Cockerham et al, 2017), so when faced with a lack of opportunities for social connection and socioeconomic prosperity (e.g. limited opportunities for careers, education, and meaningful interactions in disadvantaged and socially disordered neighbourhoods), present-oriented thinking may lead residents to use alcohol for more immediate gratification or relief. Linking (i.e., “vertical”) NSC, meaning ties to individuals and networks in higher social positions and with links to organisational authority) provides disempowered residents with means of achieving upward mobility, thus influencing their future prospects and opportunities (Weston et al, 2018). Linking NSC might therefore help shift present-oriented thinking (which lends itself to immediate gratification, e.g. drinking) to future-oriented thinking (e.g. goals, hopes, future plans), and thus motivate health-protective behaviour. Neighbourhoods with sufficient resources and NSC to provide “exposure to stimuli that might inspire thoughts of cessation” (Brookfield et al, 2019) can influence individuals’ expectations of their potential for personal growth and integration into society (Foley et al, 2022).

4.5.2. Pathway 2: Social control and norms

2a. Informal social control guides socialisation to drinking practices

Drawing on Bandura’s Social Cognitive Theory (Bandura, 2012), individual-level alcohol use is learned via observation of others’ drinking behaviour, the ways in which neighbourhood ‘role models’ use alcohol, and incentivising imitation of these drinking patterns (Alcalá et al, 2016; Best et al, 2019; Kim et al, 2020a; Nieminen et al, 2013; O’Brien, 2019; Samuel et al, 2013). Personal attitudes towards alcohol and knowledge of the risks of alcohol use also, which may be learned from actors in one’s neighbourhood environment, also determine decision-making

processes with regards to drinking (Porthé et al, 2022). Bonding NSC, which can be developed through bridging connections, enhances an individual's motivations to conform to the norms of neighbourhood groups that they value (Kosterman et al, 2014; Yang, 2017). Observable substance use behaviour in the neighbourhood indicates that this behaviour is acceptable. Alcohol consumption is especially visible in areas of high residential density and communal spaces, so this can contribute to maintenance of drinking behaviours through lessening the perceived stigma associated with alcohol (Andrews et al, 2014). A neighbourhood characterised by high social capital, social cohesion, and informal control can better enable socialisation to healthy norms, although self-identification as a network member is likely a necessary precursor, or at least facilitator, of this process (Weston et al, 2018). Empirical evidence suggests that even cohesive neighbourhoods with high collective efficacy can allow, or even encourage, alcohol problems to proliferate (Child et al, 2017; Kuipers et al, 2013; Lin et al, 2012) if residents share a sense of belonging in neighbourhoods wherein risky alcohol use is the norm.

Informal social control of alcohol use can include intervention from other residents and sanctions for norm-breaking. As such, NSC and CE are theorised to prevent the initiation of (risky) drinking but while further isolating individuals whose alcohol use has already become problematic (Karasek et al, 2012; Reboussin et al, 2019). For example, in neighbourhoods with high levels of NSC and norms of intolerance towards visible drinking behaviours, residents may engage in solitary alcohol use in their homes to avoid stigmatisation or punishment (Wray et al, 2021). Social connections within the neighbourhood constitute a means of informal social control (Brookfield et al, 2019) and the sense of cohesion derived from these connections can deter drinking if individuals feel that their health behaviours are being monitored by others (Lin et al, 2012; Seid et al, 2016). Individual alcohol use is especially likely when drinking practices are normalised both in the household and in the neighbourhood (Luca et al, 2019). In neighbourhoods lacking social cohesion and informal control, neighbours are less likely to intervene in antisocial behaviours that can cause stress, as well as those involving alcohol (Bar, 2018; Hamano et al, 2019; Mohnen et al, 2012; Reboussin et al, 2019). Higher levels of informal social control may arise from social interactions and memberships in neighbourhood organisations (i.e., social and civic engagement), which can provide alternative activities to residents other than drinking. This can promote conformity to routines that involve prosocial behaviour (i.e., “structured” activity) rather than “unstructured” activity that lends itself to lower levels of informal social control (Yang et al, 2017). This process involves a sense of belonging, which is outlined in Pathway 1a. Furthermore, NSC and cohesion can better enable residents to work together to tackle stigma around mental health problems and alcohol use. This collective action is dependent upon high levels of collective

efficacy (Cockerham et al, 2017) – a composite of social cohesion and social control – which is also theorised to increase the diffusion of information and resources. The concept of ‘cross-norm disinhibition’ in broken windows theory describes how visible disorder disinhibits risk behaviours (e.g. problem drinking) because it signals a lack of punishment for previous examples of undesirable behaviours (O’Brien, 2019). However, residence in neighbourhoods in which there are norms of intolerance towards (heavy) drinking can reinforce stigma. The impact of internalising stigma associated with drinking and neighbourhoods is summarised in Pathway 2b.

2b. Alcohol-related stigma and “othering”

High levels of NSC can promote shared understandings of alcohol-related issues, which may help to tackle or promote stigma (Best & Ivers, 2022) – depending on the values and attitudes of the residents as well as on the content (and extent of) of health-related information circulating the neighbourhood (see Section 4.5.3.). Reflecting Braithewaite’s concept of ‘disintegrative shaming’, individuals with alcohol/mental health problems may be stigmatised and excluded from society by residents of a given neighbourhood, hence worsening existing inequalities (Best, 2019; Weston et al, 2018). This process of “othering” is rooted in self-categorisation theory (Best, 2019; Menard & Morris, 2012; Weston et al, 2018) and demonstrates how tensions between ingroups (i.e. accepted members of a neighbourhood) and outgroups (i.e. problematic drinkers in, or on the peripheries of, the neighbourhood) can further fuel social divide and worsen mental health (Best, 2019; Weston et al, 2018). Informal social control in the form of overt disapproval of drinking behaviours, enacted stigma, and exclusion of individuals who do not conform to neighbourhood drinking norms can lead to the emergence of sub-cultures labelled as “deviant” (Bell, Butler & Lawther, 2021; Fomiatti, 2020; Foster & Spencer, 2013; Manton et al, 2014; Woodall & Boeri, 2014). Residents who lack a sense of community belonging may seek connection through these subcultures, which engender their own drinking practices distinct from the neighbourhood norms. This can be understood as “negative social capital” (Palombi et al, 2022) and reflects a central notion of health lifestyle theory, which is that health (risk) behaviours tend to cluster according to social strata and that “health lifestyles are not the uncoordinated behaviours of disconnected individuals” (Cockerham, 2017, p.7). Shared experiences of stigmatisation and exclusion can lead to increased bonding capital between the ostracised drinkers (Karasek et al, 2012), and this is likely to be a maintaining factor in continued use.

Residents may also internalise aspects of place-based and network-based identity and act in accordance with their respective (drinking) norms (Bahl et al, 2019). Internalised alcohol-related stigma can retain individuals in risky drinking practices as reflected by notions of “self-fulfilling prophecy” as mentioned in one paper (Bell et al, 2021). As a means to distance oneself from stigmatising labels attached to drinker groups or neighbourhoods, some individuals may stigmatise other group members (i.e., intragroup stigma). For example, some residents look to separate themselves from “the wrong people”, which may include low-income households, those receiving welfare assistance from the government, and/or other residents who use alcohol and drugs that are denigrated with pejorative labels such as “crackheads” (Foster & Spencer, 2013). Conceptualised as a process called “borderwork” (Foster & Spencer, 2013), detachment from stigmatised groups or individuals and integration into separate subcultures can help these individuals to distance themselves from place-based stigma, for example when neighbourhoods are perceived by outsiders to harbour a high proportion of residents who have alcohol problems. A negative sense of community can promote distancing from other members of the neighbourhood or drinking groups within the neighbourhood, and may be protective in contexts wherein a neighbourhood promotes excessive drinking norms (Bahl et al, 2019; Bahl et al, 2023). In neighbourhoods with norms of moderate drinking and that are less stigmatised, people who drink beyond accepted levels of alcohol use may come to identify with heavy-drinking sub-cultures, which is a barrier to reintegration to the wider neighbourhood social environment. Neighbourhoods lacking in cohesion could also encourage solitary drinking and/or consumption in the home where there may be weaker informal social control and fewer opportunities for social connection (Manton et al, 2014; Tam et al, 2021). Neighbourhood social capital is especially important when individuals lack support in their proximal environments (e.g. family, friends) or are exposed to drinking at home. Access to support from the wider community in such circumstances can remind these individuals that change is possible and disrupt home norms of alcohol consumption (Luca et al, 2019).

Difficulties (re-)integrating into the local community can hinder efforts to moderate or abstain from drinking due to lack of access to sober networks as potential resources from which social support and positive influence can be derived. Individuals immersed in subcultures come to rely on these networks for support, which can be detrimental for drinking reductions and/or recovery as identification with homogeneous groups can impede motivation to deviate from potentially damaging drinking norms (Bell et al, 2021; Weston et al, 2018). Disconnection from drinking subcultures may be required to protect one’s health and avoid “bad influences” (Bahl et al, 2022; Palombi et al, 2022), but this can result in loneliness and isolation (Vigdal et al, 2022; Webel et al, 2020), which are risk factors for poor mental health and problem drinking.

This emphasises the importance of NSC in providing access to diverse networks and activities. On the other hand, attachment and interaction within the wider community can help shift away from stigmatised drinker identities and afford opportunities for trying new things (Hystad & Bergly, 2021), thinking creatively, and finding a sense of purpose (see Section 4.5.1. Pathway 1a).

2c. Social participation increases opportunities to drink

Alcohol is heavily embedded in the social fabric of “community”, so higher levels of social participation provide residents with more opportunities for social drinking. For example, there may be expectations of drinking in some social gatherings and after meetings involved in civic or business-related activities (Murphy et al, 2014). Alcohol plays a substantial role in gaining and maintaining NSC, particularly among younger adults (Manton et al, 2014; Palombi et al, 2022; Robertson et al, 2022). Social network expansion within the neighbourhood facilitates access to social support and other benefits that can be obtained from various networks (see Section 4.5.3.). An individual’s position in the social hierarchy of their neighbourhood may in part determine their drinking motives and practices, for example, drinking to gain or preserve social status and to fit in (Kim et al, 2020; Palombi et al, 2022). Social bonds acquired from this process facilitate conformity to the prevailing drinking norms. However, the risks associated with alcohol may be underestimated in neighbourhoods rich in social capital if frequent and/or heavy drinking is normalised. Social drinking also promotes trust, potentially because reduced inhibitions whilst intoxicated can help to identify network members who do not share the same values or goals, and who may pose a threat to NSC. Repeated interactions are important for preserving stores of NSC (Andrews et al, 2014; Bahl et al, 2022; Izenberg et al, 2018) so individuals wishing to avoid social drinking situations may withdraw from the community. This could help to reduce use and maintain sobriety but at the expense of social connection and potentially mental health.

4.5.3. Pathway 3: Diffusion of information and resources via social networks within the neighbourhood

3a. Access to actual and perceived support

The relationship between alcohol use and mental health is well-documented (e.g. Bell & Britton, 2014; Lai et al, 2015; Yang et al, 2018; see Section 1.1.), therefore it is not covered in detail in this review. Neighbourhood social capital can enable access to social support, which can buffer against the negative effects of neighbourhood stressors and reduce drinking to cope with psychological distress (Alcala et al, 2016; Kiani et al, 2023; Larm et al, 2016; Mayne et al, 2017; Murphy et al, 2014). This may be because NSC enhances perceived safety, which can be beneficial for the psychosocial processes described in Pathway 1 (Reitzel et al, 2013). Even when social support does not prevent alcohol consumption, trusting relationships can be instrumental in ensuring safer alcohol use because neighbours looking out for one another may be able to limit exposure to violence (Handlovsky, Bungay, Johnson & Phillips, 2013). Forms of social support include material support, such as lending money or food (Bahl et al, 2019; Manton et al, 2014), and practical support, such as providing transport or temporary care for dependents (e.g. children, pets) (Bahl et al, 2023). These forms of support may help reduce barriers to accessing recovery services (Palis, Marchand & Oviedo-Joekes, 2020). Emotional support in the form of encouragement to engage in health services or maintain efforts to reduce drinking can also prevent risky alcohol consumption (Fomiatti, 2020). However, discordance between the perceived and actual support available can worsen drinking because this presents opportunities for those receiving support to feel shame, exploited, or let down (Fomiatti, 2020).

The provision of social support sometimes involves drinking, so although access to support may reduce stress and consequent drinking to cope, it does not necessarily reduce alcohol consumption and may even promote drinking in some circumstances. In some neighbourhoods, particularly those that are socioeconomically disadvantaged, drinking to cope with personal and neighbourhood stressors may be normalised (Luca et al, 2019; Rachele et al, 2016). Similarly, norms of reciprocity may lead individuals to repay helpful neighbours with alcohol (Manton et al, 2014). Receipt of social support can also be a source of stress when people feel indebted to neighbours and feel unable to reciprocate the assistance they accessed. One paper suggested that support derived from the neighbourhood signals to the individual receiving the support that they are valued and worthy of the support.

This has implications for one's sense of belonging and identity, and suggests that access to social support itself can constitute an opportunity for drinking (see Section 4.5.2. Pathway 2c). Perceptions that social support can be accessed in the neighbourhood environment may be particularly beneficial when individuals are unwilling to seek formal support for their drinking due to barriers such as (perceptions of) stigmatisation from health care professionals, and anticipation of discrimination and difficulties with accessing these services. In other words, social support from neighbours – whether related or unrelated to alcohol – can substitute formal help, which can help to reduce stress and increase an individual's capacity to moderate or abstain from drinking.

3b. Access to information related to alcohol and wellbeing

Diffusion of innovations theory posits that health-related innovations are disseminated more effectively in cohesive neighbourhoods. As drinking norms within a given neighbourhood change over time, residents “who interact within the community the most will be more likely to accept and conform to those ‘norms’” (Giordano, 2010, p. 352; Gondal et al, 2023). Giordano et al (2011) refers to bans on smoking in restaurants as an example. Higher levels of social capital and social cohesion facilitate the diffusion of health-related information and resources (Cockerham et al, 2017; Giordano et al, 2011; Islam et al, 2017; Lin et al, 2012; Studer et al, 2016; Tsai et al, 2020;) as they enable greater communication between residents and access to health-related media or local news/events (Yamamoto & Ran, 2013). Furthermore, this diffusion occurs more efficiently in networks that are smaller, denser, more homogenous and/or have a higher degree of closure (Child et al, 2017). In the context of alcohol use (and mental health), it may be that information about new substance use prevention or treatment services, self-help groups, health apps or other technological innovations, other health-promoting facilities and activities, or licensing legislation is disseminated more efficiently in cohesive neighbourhoods. Similarly, diffusion of information about neighbourhood events, services and recreational facilities can prevent alcohol consumption as this generates awareness of opportunities to engage in meaningful activities. The role of these activities in determining individual alcohol consumption is described in Section 4.5.1. Pathway 1a with regards to their impact on people's sense of purpose and belonging.

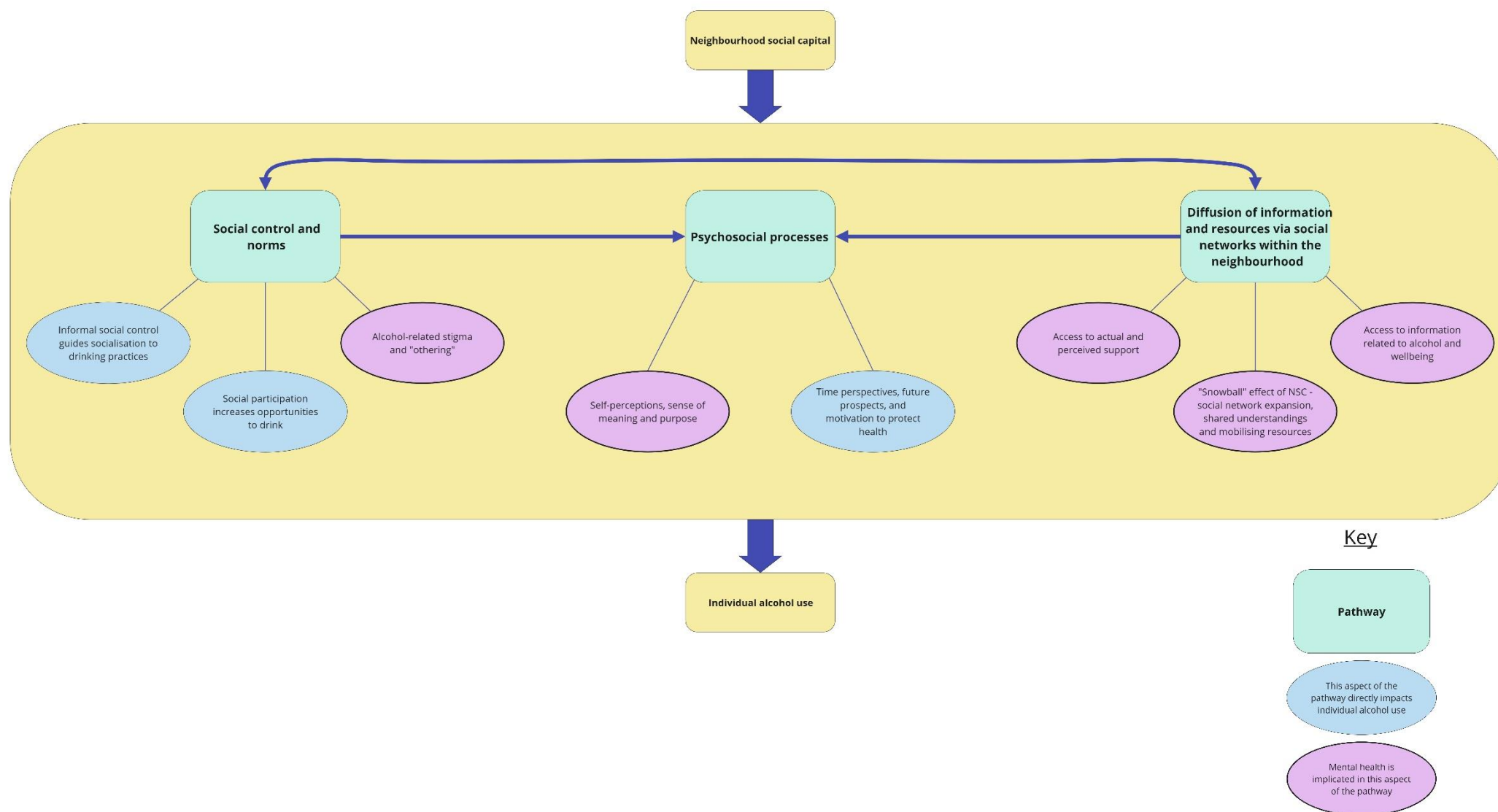
Whether alcohol-related advice from neighbours is acted upon is likely to depend on trust, which is itself a key aspect of NSC (Namkoong et al, 2018). However, “weak” ties (i.e., bridging social capital) rather than “strong” ties (i.e., bonding social capital) enable access to new ideas beyond those circulating proximal networks (Manton et al, 2014) and can promote a more

diverse, inclusive climate (Weston et al, 2018). Weston et al (2018) suggest that bonding social capital is more crucial in the early stages of recovery from substance use problems, whereas bridging and linking social capital are assets that can later help reconnect the individual to other recovery-supporting networks and the wider community. The spread of health-related information can also improve residents' understanding of the risks and harms associated with alcohol, which can help neighbourhoods to be united in their efforts to address problems related to drinking in the area. Neighbourhood cohesion and trust in "bridging" (or "weak") ties are particularly important because they improve the likelihood that this knowledge will be tailored to the neighbourhood "habitus" (Luca et al, 2019) and therefore effectively communicated.

3c. The "snowball" effect of NSC – social network expansion, shared understandings, and mobilising resources

Indicators of NSC are theorised to interact with each other, and provide self-reinforcing feedback, i.e., stores of social capital promote acquisition of further social capital. The current analysis suggests a "snowball" effect of NSC, whereby social participation increases opportunities to expand one's social network, which can facilitate access to new activities, ideas, and resources. In the context of alcohol use, this can include awareness of (and introduction into) activities and organisations that help to generate a sense of meaning and purpose in life (see Section 4.5.1. Pathway 1a) and access to residents who can act as role models for change or provide social support (see Section 4.5.2. Pathway 2a and Section 4.5.3. Pathway 3a). Collective efficacy afforded by NSC can lead to mobilisation of community resources to address alcohol-related harms in the neighbourhood through, for example, supporting engagement in health promotion interventions (Andrews et al, 2014), restrictions on alcohol in local establishments (Larm et al, 2016), and advocating for therapeutic communities (Best et al, 2014). Since the advantages accrued from high levels of NSC trickle down to affect network-level interactions (and consequently individual-level behaviours), high levels of NSC are not likely to benefit all residents equally (Crasta, Funk, Lee & Rogge, 2018). Instead, NSC can lead to health communication inequalities because different networks within the neighbourhood will receive different media and messages from their network members, particularly in disordered neighbourhoods in which community is fragmented into drinking subcultures. Even residents who do not drink at harmful levels or are not connected to individuals with alcohol problems may come to "realize that they somehow have a systemic part, not only in the problems of addiction in society but also the solutions" when they reside in areas with high NSC, which can "tip the scales in a positive direction" (p.18, Eng, 2020).

Figure 4 - Conceptual framework depicting the theorised pathways from neighbourhood social capital to individual alcohol use



4.6. Discussion

Theoretical and empirical literature was synthesised to develop a novel conceptual framework, which included three distinct but overlapping pathways from NSC to individual alcohol use. The pathways from the neighbourhood social environment to alcohol use described in this paper draw attention to the potential health and social benefits of building more cohesive neighbourhoods, as well as the possibility of increasing alcohol use with social capital gains. The theoretical framework largely reflects the widely-cited pathways from NSC to individual health proposed by Kawachi and Berkman (2000), which include diffusion of knowledge and informal social control of health-behavioural norms. Current findings also support their contention that NSC can enable access to services and other resources that promote psychological benefits due to availability of support. However, previous work – including many of the studies included in this review – referred to these mechanisms in a brief and generic manner when applying them to health-related behaviours such as alcohol use, while explanations and examples of *how* these processes operate were overlooked. The current study builds on these previous insights and provides a more comprehensive summary of the influences of neighbourhood social factors on drinking practices, but deviates from Kawachi and Berkman's (2000) work by collapsing "access to support" into "diffusion of knowledge". This decision was driven by consideration of previous literature that suggests informational support is a type of social support (Gottlieb & Bergen, 2010). The study reiterates findings from previous reviews, which have reported mixed and inconclusive results regarding the association between NSC and alcohol use (Bryden et al, 2013; Jackson et al, 2014). A stronger protective effect of cognitive NSC was found whereas the evidence for structural NSC was more mixed, whereby there was a tendency towards evidence for the "dark side" of NSC (Nie et al, 2018; Villalonga-Olives et al, 2020). Alcohol consumption can facilitate physical closeness between strangers (Gurrieri, Fairbairn, Sayette and Bosch, 2021), which may help explain the positive associations between structural NSC and alcohol use reported by included studies. Through the lens of social capital theory, this suggests that alcohol can be used to develop bridging capital ("weak" ties), which, as explained above, may be accompanied by various psychological and social benefits.

Although the review did not focus specifically on the impact of NSC on mental health, there was a salient role of NSC in reducing stress and mental distress, strengthening psychosocial resources, and undermining (or promoting) feelings of isolation through "othering". In line with previous reviews, this evidences a protective effect of NSC on mental health, which is itself correlated with alcohol consumption (see Section 1.1.). Alcohol may be used to cope with

stress and/or deteriorating mental health in the face of adverse neighbourhood environments via “self-medication” (Khantzian, 1997, 2003; Turner et al, 2018), so higher levels of NSC may help to deter antisocial behaviours and indirectly prevent risky drinking. This is in line with some previous research that suggests declining mental health may precede increased alcohol use, rather than the reverse relationship (Conner et al, 2009; Turner et al, 2018), and is supported by a longitudinal study included in this review that found the effect of NSC on alcohol use was mediated by depression (Tsai et al, 2020). Although the review did not examine the role of neighbourhood physical or socioeconomic factors, it is important to note that neighbourhood disadvantage and associated problems can be sources of chronic stress (Steptoe & Feldman, 2001). This more widely-recognised narrative focuses on “negative” neighbourhoods, while less attention has been paid to how “positive” neighbourhoods (i.e, high cohesion, low disorder) can still perpetuate risky drinking. Bordering more affluent areas may enhance the sense of unfairness and socio-geographic divide, which has negative implications for mental health (Kearns, Whitley, Bond, Egan & Tannahill, 2013) and self-rated morbidity (Zhang, Cook, Lisboa, Jarman & Bellis, 2013).

Time perspectives have gained less attention than the other mechanisms in neighbourhood research (Zimbardo & Boyd, 2015). Prior studies investigating the relationships between time perspectives and substance use support the findings presented in this review, suggesting that future-oriented perspectives are associated with a lower likelihood of risky drinking, drug use and smoking (Adams & Nettle, 2009; Beenstock, Adams & White, 2011; McKay, Andretta, Magee & Worrell, 2014; Sansone et al, 2013). However, research on these relationships is scarce, perhaps due to a tendency towards cross-sectional studies and a lack of available large scale representative population data that contains assessments of time perspectives. This mechanism somewhat maps onto Bronfenbrenner’s chronosystem, situated at the very outer layer of the socio-ecological model of (child) behaviour (Bronfenbrenner, 1986; Section 1.1.6. provides detailed descriptions of the model and application in the context of alcohol use). In the context of neighbourhood and alcohol use, changes in the environment’s social features (e.g. social capital, social control) may stem from changes to the socioeconomic/structural environment such as displacement resulting from gentrification, local authority budget cuts, and availability of green space, which have also been previously linked to individual-level substance use (Beyer et al, 2014; Dzhambov et al, 2018; Izenberg et al, 2018). Previous research has also linked higher socioeconomic status with future-oriented thinking (Fieulaine & Apostolidis, 2015; Guthrie, Butler & Ward, 2009), which further supports the inclusion of this mechanism, as a means to link drinking behaviours to both the social and built neighbourhood environment. Burzynska and Stolarski (2020) recently proposed several theoretical models that hypothesise how mental health may be impacted by time perspectives

and what they call wellbeing “boosters” (“gratitude”, “savouring the moment”, and “prioritising positivity”). These models are yet to be tested but may be of significance to future research investigating neighbourhood determinants of drinking behaviours.

4.6.1. Strengths and limitations

A particular strength of this study is that it draws on theories from a range of disciplines, including sociology, health economics, psychology, and criminology. This is also a likely explanation for the differences between papers in understanding, defining and measuring alcohol use (e.g. ‘deviant’ behaviour vs. ‘recreational’ health-related-behaviour). Given that the field of research on neighbourhood environments and substance use behaviours is still in its early stages, the broad range of perspectives incorporated into this work is beneficial for bridging ideas from various backgrounds and advancing a more complete understanding of some of the social mechanisms underlying drinking behaviour. This study also highlights time perspectives as a potentially important cognitive process involved in the relationship between neighbourhood social factors and alcohol use, which is mostly absent from research on health and place.

Qualitative synthesis involved only one researcher’s subjective interpretation with regards to reducing theories into their conceptual components, organising them into a framework and delivering a supporting narrative, lending the results to a degree of bias. Nonetheless, subjectivity and abstraction are welcomed in qualitative syntheses, and it is acknowledged that different researchers will generate different explanations based on the same data (Noblit & Hare, 1988). It is also important to note that the original papers in which the theories were proposed were not analysed. Hence, the analysis presented here is, in effect, “an interpretation of interpretations of interpretations” (p.21, Weed, 2008). Despite steps 4 and 5 of BFFS (Figure 1) not being conducted, this is unlikely to have substantially impacted the framework as the theories specified in Table 6 were repeatedly alluded to in several included papers and empirical evidence contributed little to the development of the pathways – instead providing insight into the strength and direction of associations rather than the mechanisms. Although mental health plays an important role in the relationship between NSC and alcohol use, as demonstrated through the framework as well as some previous research (Tsai et al, 2020), empirical evidence relating to neighbourhood determinants of mental health was not synthesised. This was partially due to time constraints and because there is general consensus that neighbourhood cohesion is beneficial for mental health whereas neighbourhood disorder is detrimental to mental health (Ehsan, Klaas, Bastianen & Spini,

2019; O'Brien et al, 2019; Silva, Loureiro & Cardoso, 2016). Understandings of neighbourhood determinants of alcohol use are less clear. The initial database searches for theories also used keywords that centred around substance use in general, and so, despite filtering these papers to refine the focus on alcohol use, some theories were described with a greater emphasis on either illicit drug or tobacco use. In the context of illicit drug use, for example, it is likely that a different set of social processes occur in the pathways from the neighbourhood environment to consumption, particularly with regards to obtaining drugs, their legal status and associated policy/legislation, locations and visibility of use, and drug-related stigma. Previous research suggests that people who use alcohol may be less strongly stigmatised compared to people who use illicit drugs (Kilian et al, 2021), which is likely due to the legal status of alcohol (Douglass et al, 2023). There is also evidence that alcohol outlet density is associated with higher rates of alcohol consumption and related harms (Gmel et al, 2016), indicating that alcohol accessibility is an important determinant of drinking behaviours.

The papers included in this review operationalised neighbourhood social factors and alcohol outcomes in different ways, which made comparison of findings difficult. For example, the studies related to a variety of alcohol outcomes such as binge drinking, hazardous alcohol use, public alcohol use, AUD, drinker status, and quantity/frequency measures. Many papers retained for theory synthesis also only provided very brief explanations as to how neighbourhood social factors influence drinking behaviours, so qualitative analysis did not capture a nuanced understanding of how the proposed mechanisms operate.

4.6.2. Implications

Most of the quantitative data synthesised in this review related to risky drinking practices, while a large proportion of the papers included for qualitative analysis pertained to recovery from AUD. Since neighbourhood research in this area tends to problematise drinking, it would be beneficial for future studies to also investigate whether and how contextual social factors such as NSC influence lower risk drinking patterns (e.g. quantity/frequency, drinker status). A spectrum-based approach to examining contextual determinants of drinking practices would be helpful because it would allow a better understanding of fluctuations in alcohol use at the neighbourhood level, which would not be forthcoming with a binary approach (i.e., problem vs. non-problem drinking). In addition, closer examination of how specific indicators of NSC influence alcohol outcomes would provide a more nuanced understanding of the mechanisms theorised here, so that the findings could be used to inform and tailor neighbourhood interventions to address alcohol harms. Recent community-based health campaigns have

primarily aimed at creating more cohesive neighbourhoods (Best & Colman, 2019; Orazani, Reynolds & Osborne, 2023) since NSC is typically viewed by stakeholders as a community asset. However, the current findings caution against generic efforts to boost cohesion – instead they suggest that, having identified NSC (particularly structural aspects) as a risk factor for problem drinking, it may be useful to develop tailored interventions that encourage meaningful social participation in sober neighbourhood events that are accessible to a diverse audience. This reiterates the potential for “visible recovery” to have positive effects on not only mutual support groups but the wider community (Best & De Alwis, 2017). As illustrated in the framework, opportunities for people in recovery to “give back” to their community can have positive implications for their own health via psychosocial processes, but these contributions can also lead residents to view the recovery community as “resource for that community that goes beyond managing substance misuse issues” (p.5, Best & Laudet, 2010). A final recommendation for future research is to conduct theory-driven studies within a multilevel framework to distinguish individual- from contextual-level effects.

4.7. Conclusion

A novel conceptual framework of the mechanisms underlying associations between neighbourhood social environments and individual alcohol use was developed using qualitative research methods that drew on extant theoretical and empirical literature. A heterogeneous pool of papers enabled consideration of perspectives from different disciplines that converged into three intersecting pathways with various sub-domains: (i) socialisation to normative drinking practices via informal social control processes; (ii) cultivating or impeding psychosocial processes; and (iii) diffusion of health-related information and social support. Regarding empirical evidence to support the framework, there were mixed findings across the included studies, which pointed to positive, negative and no relationship between neighbourhood social factors and alcohol use. However, there was a tendency towards support for the “dark side” of structural social capital in particular and stronger tendency towards a protective effect of cognitive social capital, which is of high public health importance given that alcohol support programmes often endorse social support and community (re-)integration as key components of the recovery process. Similarly, practitioners and stakeholders involved in community development initiatives should be mindful of both the potential benefits and pitfalls of building NSC, particularly in disadvantaged and disinvested areas.

CHAPTER 5: Study 2: Investigating longitudinal relationships between neighbourhood social factors and alcohol use trajectories in the English general population using latent class growth analysis

This chapter describes the methods used to identify and characterise latent trajectory classes of drinker types in the English general population, presents the results from this analysis, and discusses the findings contextualised within the wider literature. The study builds on the previous chapter as it tests the theoretical framework developed in Study 1 by establishing whether, and to what extent, NSC is predictive of drinking trajectories. This chapter also adds to the pool of empirical studies synthesised in Study 1 and helps to address the lack of UK research in this area.

5.1. Aims and objectives

The overall aim of the study was to identify and examine group-based alcohol use trajectories in the English adult general population, with a secondary aim of investigating associations between trajectory class membership, sociodemographic characteristics, mental health, and neighbourhood factors.

Latent class growth analysis (LCGA; see Section 3.4. for a methodological summary) was used to address the following objectives:

- i) To determine the optimal number of latent trajectory classes of drinking behaviours in the adult English general population;
- ii) To test associations between covariates (sociodemographic characteristics, mental health, and neighbourhood factors) and trajectory class membership;
- iii) To examine whether trajectory class membership predicts mental health as a distal outcome (at Wave 11; 2019-2021).

5.2. Methods

5.2.1. Study population

Understanding Society (also known as the UK Household Longitudinal Study, UKHLS) is a longitudinal, nationally representative panel study of approximately 40,000 UK households (at Wave 1). The study began in 2009 as an extension of the British Household Panel Survey (BHPS, which began in 1991) and, as of 2021, there are 11 ‘waves’ of data available that are collected from household members aged ten years or older on an annual basis. Participants aged 10-15 comprise a separate youth sample and respond to a different series of questions than the adult (aged 16+) questionnaire. The latter (i.e. adult) sample was used for the current analyses. Although the project aims to follow-up the same respondents recruited for Wave 1, there are some households that are not included in subsequent waves due to attrition and new households are included in subsequent waves (e.g. booster samples, or in the case of adult children moving out from their parents’ home). Respondents’ information was collected via interviews (face-to-face, web-based, telephone) and self-report questionnaires. Data is geocoded at various geographical levels, including at the LSOA-level, which permits linkage to Index of Multiple Deprivation (IMD) scores. The dataset includes a General Population Sample (GPS) of non-institutionalised adults, an Ethnic Minority Boost (EMB) sample, an Immigrant and Ethnic Minority Boost sample (IEMB), and a sample of BHPS participants who consented to join Understanding Society (Lynn, 2009; Lynn, Nandi, Parutis & Platt, 2017). The GPS was obtained via stratified and clustered sampling of UK residential addresses situated within 2,640 primary sampling units (PSUs). The EMB sample was present from Wave 1 of UKHLS whereas the IEMB sample was introduced from Wave 6 onwards.

The current study uses data from Waves 6 (2014-2016), 7 (2015-2017), 9 (2017-2019) and 11 (2019-2021). These waves had respective individual-level response rates of 84% (of 40,158), 88% (of 36,559), 85% (of 36,993) and 87% (of 33,186), based on participants who participated in the previous wave (e.g., response rate for Wave 6 calculated based on those who were present at Wave 5) (Understanding Society, n.d.). Waves 8 and 10 were omitted from the current analysis because alcohol use was assessed via basic quantity/frequency measures rather than the AUDIT-C (administered at Waves 7, 9 and 11), which was the preferred alcohol assessment tool because it has been previously validated and found to have high reliability (de Meneses-Gaya et al, 2009; Reinert & Allen, 2007). For the purpose of the current study, the sample was restricted to include only adult (aged 18 or above) respondents residing in England at Wave 6. Responses via proxy were excluded. Proxy responses are

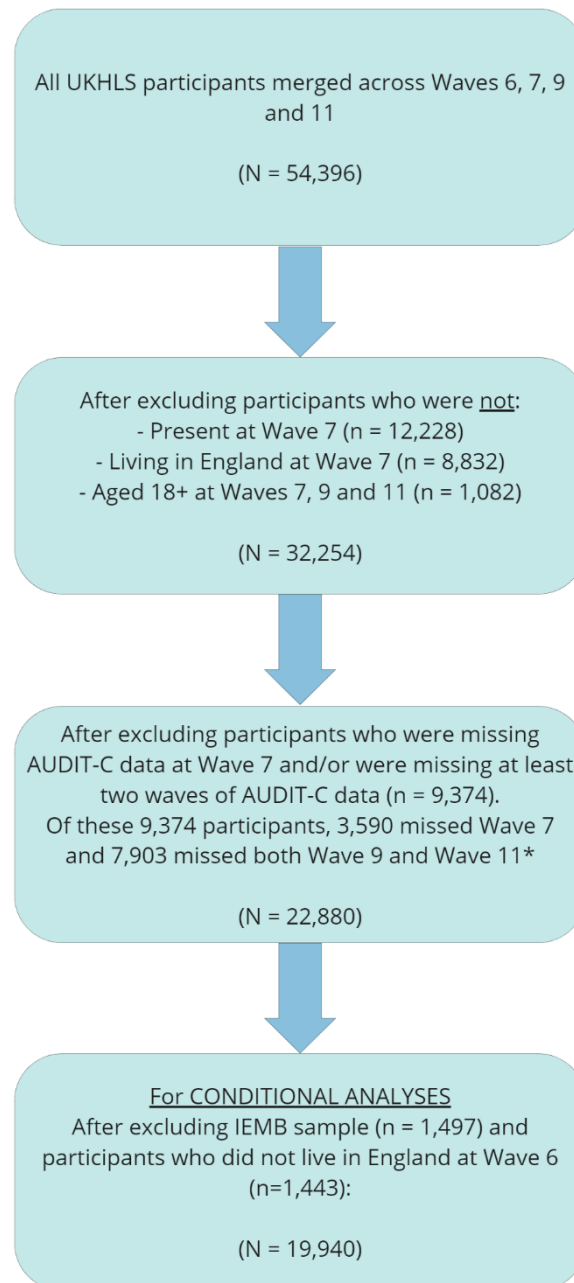
recorded in cases where the invited participant is unable to participate and someone else in their household provides a response on their behalf. The proxy interview is limited to factual information and therefore is shorter than the full survey, meaning that data for the variables of interest in the current study are not available for these participants. New entrants to the sample (e.g. youth sample turning 16 and joining the adult sample from Wave 7 onwards) who were under 18 at any of the included waves were also excluded to ensure findings were applicable to adults only. There were two key reasons for restricting analyses to only those residing in England: i) there are differences in how IMD scores for England are calculated compared to other UK countries, and ii) differences in alcohol policies and legislation between UK countries (e.g. Minimum Unit Pricing of alcohol in Scotland). Participants who did not have at least two waves of AUDIT-C data – including at Wave 7 – were also excluded as one datapoint would not allow examination of their drinking trajectories.

From an initial sample of 54,396 (which included all participants merged across Waves 6, 7, 9 and 11), participants who did not respond at Wave 7 ($n = 12,228$), did not live in England at Wave 7 ($n = 8,832$), and were aged under 18 at Waves 7, 9 or 11 ($n = 1,082$) were dropped – leaving 32,254 participants. A further 9,374 participants were excluded because they did not have at least two waves of alcohol use data within the timeline of the current analysis (see Table 1 for comparison of the characteristics of those with and without missing alcohol use data). A total of 3,590 participants missed AUDIT-C at Wave 7 despite being present at that wave. Of the 9,374 participants excluded for missing AUDIT-C data, there were 7,903 (84.31% of 9,374) participants who missed AUDIT-C at both of Waves 9 and 11, which was mostly explained by these participants ($n = 6,777$, 72.30% of 9,374) missing Waves 9 and 11 entirely rather than missing the AUDIT-C items specifically. When respondents were present at a given wave but did not have AUDIT-C data for that wave, the most common reason for this was that these individuals participated via proxy and AUDIT-C is not included in the proxy questionnaire. All eligible participants had AUDIT-C data for Wave 7 and at least one other wave, to allow for trajectory analyses with full baseline alcohol use data.

The final analytic sample for the unconditional analyses included 22,880 participants. For conditional analyses, the remaining IEMB sample ($n = 1,497$) and participants who did not indicate that they lived in England at Wave 6 ($n = 1,443$) were excluded, leaving a total sample size of 19,940 participants. The IEMB sample was excluded because they were not administered the questions about neighbourhood social cohesion, organisational membership, and volunteering, which are used as indicators of NSC in this study. Note that conditional analyses included 238 participants (1.19% of the sample) who were aged 16-18 at

Wave 6. Figure 5 summarises the participant selection process based on the eligibility criteria described in this section.

Figure 5 - *Participant selection process for LCGA*



Note that the total participants missing Wave 7 plus the total participants missing both Waves 9 and 11 do not sum to 9,374 because some participants missed all 3 waves and thus were only present at Wave 6

Table 7 compares the sociodemographic characteristics (from Wave 7), NSC (from Wave 6), and mental health (from Wave 7) for the sub-samples who did and who did not have at least two waves of AUDIT-C data. These sub-samples were drawn from the UKHLS sample, who, except for missing AUDIT-C data, were otherwise eligible (i.e., English residents aged 18+ who responded at Wave 7). Bivariate associations (i.e. chi-square) showed that all covariates were significant predictors of AUDIT-C missingness. Compared to those with at least two waves of AUDIT-C data, those with missing AUDIT-C data were more likely to be male, younger, single, non-white, religious, and unemployed. They also had lower educational attainment (i.e., lower proportion with a degree or higher and a greater proportion with no qualifications) and lower income. A much greater proportion of those with missing data lived in neighbourhoods characterised as “high deprivation” and they were more likely to reside in urban (rather than rural) areas. Overall, those with missing AUDIT-C data had worse mental health and lower levels of all social capital indicators. High rates of missingness for neighbourhood factors can be explained by two key reasons. Neighbourhood factors were assessed at Wave 6 while all other variables were assessed at Wave 7. Since non-participation at Wave 6 did not disqualify individuals from being included in the analytic sample, higher levels of missing data for these variables can be explained by a proportion of participants (n = 3,030) missing Wave 6 entirely. The other main reason is that the IEMB sample were not administered these questions, despite their presence at Wave 6. Given that individuals with missing AUDIT-C data were also much more likely than the analytic sample to be missing mental health data, logistic regressions were conducted to compare the drinking characteristics of those with and without mental health data. Participants with missing mental health data had 3.23 higher odds of being a non-drinker and had significantly lower AUDIT-C scores (both on individual items and on the composite score) at Wave 7.

Table 7 - Comparing the sociodemographic characteristics, NSC, and mental health of those with and without at least two waves of AUDIT-C data

		Full UKHLS sample ^a (N = 32,254)				
		Analytic sample for unconditional LCGA (N = 22,880)		Missing AUDIT-C data ^b (N = 9,374)		
		<i>n</i>	% / mean (±SD)	<i>n</i>	% / mean (±SD)	<i>p</i> -value ^c
Individual factors						
Gender	Males	9,989	43.66	4,831	51.54	<.01
	Females	12,891	56.34	4,542	48.46	
	Total	22,880		9,373		
	Missing	0	0	1	<1%	
Age	18-34	5,006	21.88	3,143	33.54	<.01
	35-49	6,535	28.58	2,452	26.17	
	50-64	6,237	27.26	1,802	19.23	
	65+	5,102	22.30	1,974	21.06	
	Total	22,880		9,371		
	Missing	0	0	3	<1%	
Education	University degree or higher	9,442	42.08	2,870	32.62	<.01
	Post-secondary (i.e., A-level etc)	4,769	21.25	1,954	22.21	
	Secondary (i.e., GCSE etc)	4,276	19.06	1,703	19.36	
	Other	2,022	9.01	875	9.95	
	No qualifications	1,929	8.60	1,396	15.87	
	Total	22,438		8,798		
	Missing	442	1.93	576	6.14	
Ethnicity	White	18,523	81.50	5,438	62.92	<.01
	Non-white	4,204	18.50	3,205	37.08	
	Total	22,727		8,643		
	Missing	153	<1%	731	7.80	
Religious	Yes	11,829	55.46	4,550	64.01	<.01
	No	9,499	44.54	2,558	35.99	
	Total	21,328		7,108		
	Missing	1,552	6.78	2,266	24.17	
Marital status	Single/civil partnership	6,787	29.70	3,730	39.97	<.01
	Married/registered civil partnership	13,017	56.95	4,403	47.18	
	Separated/divorced/widowed	3,051	13.35	1,200	12.86	
	Total	22,855		9,333		
	Missing	25	<1%	41	<1%	
Employed	Yes	13,831	60.51	3,753	52.39	<.01
	No	9,025	39.49	3,411	47.61	
	Total	22,856		7,164		
	Missing	24	<1%	2,210	23.58	
Income	Lowest tertile	7,082	30.98	3,664	39.10	<.01
	Middle tertile	7,761	33.95	3,113	33.22	
	Highest tertile	8,020	35.08	2,593	27.67	
	Total	22,863		9,370		
	Missing	17	<1%	4	<1%	
GHQ	Total	22,787	10.88 (5.41)	5,846	11.25 (5.78)	<.01
	Missing	93	<1%	3,528	37.64	
Neighbourhood factors						

Neighbourhood deprivation						<.01
	Low deprivation	7,790	36.34	1,946	25.07	
	Moderate deprivation	7,368	34.37	2,362	30.43	
	High deprivation	6,279	29.29	3,453	44.49	
	Total	21,437		7,761		
	Missing	1,443	6.31	1,613	17.21	
Urban vs. rural						<.01
	Urban	17,142	79.90	6,702	86.30	
	Rural	4,312	20.10	1,064	13.70	
	Total	21,454		7,766		
	Missing	1,426	6.23	1,608	17.15	
Social capital indicators						
Perceived neighbourhood social cohesion						<.01
	Low cohesion	7,462	38.41	2,030	41.66	
	Moderate cohesion	8,314	42.80	2,030	41.66	
	High cohesion	3,651	18.79	813	16.68	
	Total	19,427		4,873	4,873	
	Missing	3,453	15.09	4,501	48.02	
Membership in organisation(s)						<.01
	Yes	10,934	56.47	2,146	43.92	
	No	8,429	43.53	2,740	56.08	
	Total	19,363		4,886		
	Missing	3,517	15.37	4,488	47.88	
Volunteer (past year)						<.01
	Yes	4,598	23.33	812	16.27	
	No	15,108	76.67	4,178	83.73	
	Total	19,706		4,990		
	Missing	3,174	13.87	4,384	47.77	

^aThe "full" UKHLS sample refers to the total number of participants merged across Waves 6, 7, 9, and 11, who were aged 18+, present at Wave 7, and living in England at Wave 7.

^b"Missing AUDIT-C data" refers to participants that did not have at least two waves of AUDIT-C data, including at Wave 7. This includes 3,590 (38.30%) participants who missed AUDIT-C at Wave 7. Of the 7,903 (84.31% of 9,374) participants that missed AUDIT-C at both of Waves 9 and 11, 6,777 (72.30% of 9,374) participants missed both Waves 9 and 11 entirely.

^cThis is the *p*-value associated with chi-square statistics that were calculated to assess whether, in the full sample, covariates (far left column) predict AUDIT-C missingness at baseline.

A binary dummy variable was used to categorise participants from the full sample as being eligible (i.e., having at least two waves of AUDIT-C data, coded as 0) or ineligible (i.e., does not have at least two waves of AUDIT-C data, coded as 1), as reflected in the Table 7 columns. This was to further investigate the missingness mechanism via a series of logistic regressions that examined the association between the dummy variable and baseline (i.e. Wave 7) AUDIT-C responses. In other words, this compared the drinking characteristics of those who were included versus those who were dropped from (unconditional) analyses. Table 8 shows that participants who were excluded due to missing AUDIT-C data differed significantly on all

AUDIT-C items and total AUDIT-C score from those who were included. At Wave 7, participants who were excluded due to AUDIT-C missingness drank at a lower frequency, were less frequent binge drinkers, and had a lower overall AUDIT-C score, but they would drink higher quantities of alcohol on a typical drinking day. Details of how missing data within the analytic sample was handled are reported in Section 5.2.3.

Table 8 - Odds ratios for AUDIT-C missingness predicted from AUDIT-C item responses

	OR (SE)	95% CI	p
Drinking frequency	0.82 (0.01)	0.80-0.84	<.01
Drinks on a typical day	1.04 (0.02)	1.01-1.08	<.05
Binge drinking frequency	0.92 (0.01)	0.90-0.95	<.01
Total AUDIT-C score	0.94 (0.01)	0.93-0.95	<.01

Table 9 shows the proportion of the analytic sample that responded to all AUDIT-C items at the three included waves. In total, 75.45% of the analytic sample had AUDIT-C data at all three waves, 93.11% had AUDIT-C data at Wave 7 and Wave 9, and 82.34% had AUDIT-C data at Wave 7 and Wave 11.

Table 9 - AUDIT-C response rates for the analytic sample

Wave	Analytic sample (N = 22,880)
	n (%)
7, 9 and 11	17,263 (75.45)
7 and 9	21,303 (93.11)
7 and 11	18,840 (82.34)

^aThis table shows the proportion of participants, out of the analytic sample, who provided AUDIT-C data at: all three waves, Wave 7 and Wave 9 only, and Wave 7 and Wave 11 only. This includes non-drinkers who were given a total AUDIT-C score of zero because they responded “no” to the question: “In the past 12 months have you taken an alcoholic drink?”. These participants were not administered the three AUDIT-C items but could be included as non-drinkers.

Table 10 shows the prevalence of non-drinkers, and those who screened positive (i.e., scoring 5+) and negative (i.e., scoring <4) on the AUDIT-C at each wave. Non-drinkers include participants who responded “no” to the screening question (i.e., whether they had drank alcohol in the past year) as well as participants who scored 0 on the AUDIT-C despite

indicating “yes” to the screening question. The proportions of each drinker type remained relatively stable over time, with non-drinkers comprising approximately one fifth of the sample at each wave. Among those classed as non-drinkers at baseline, 10.94%(n=2,504) participants were persistent non-drinkers who did not drink alcohol at any of the included waves; and 4.36% participants (n=997) were (non-drinkers at baseline and became current drinkers at a later wave. At each wave, approximately half of the sample screened negative for risky drinking while a quarter of the sample screened positive (Table 10). Note that these categories are based on AUDIT-C classification convention, in order to describe the study sample prior to analysis, and do not represent the latent classes identified via LCGA.

Table 10 - *Prevalence of drinker types at each wave, according to the AUDIT-C classification system (i.e., positive screen for risky drinking = 5+)*

	Wave 7	Wave 9	Wave 11
Non-drinkers	4,959 (21.67%)	4,638 (21.77%)	4,268 (22.65%)
Negative screen for risk drinking	11,516 (50.33%)	10,800 (50.70%)	9,874 (52.41%)
Positive screen for risk drinking	6,405 (27.99%)	5,865 (27.53%)	4,698 (24.94%)
<i>n</i>	22,880	21,303	18,840

5.2.2. Measures

5.2.2.1. Neighbourhood-level variables

Deprivation

Small-area level relative deprivation was assessed using Index of Multiple Deprivation (IMD) 2015 data, which was obtained from the Ministry of Housing, Communities and Local Government. The English IMD is a composite measure of (relative) deprivation, which is calculated based on scores from 38 indicators across seven (weighted) domains of deprivation: income (22.5%), employment (22.5%), health and disability (13.5%), education and skills training (13.5%), crime (9.3%), barriers to housing and services (9.3%), and living environment (9.3%). Deprivation scores are allocated to LSOAs across England and ranked from 1 (most deprived) to 32,844 (least deprived), thus allowing comparison between areas on disadvantage. For the current analyses, IMD scores were converted from continuous data into tertiles to allow comparison of alcohol use trajectories across three ordinal categories of

deprivation. Tertile 1 included the least deprived LSOAs whereas the tertile 3 included the most deprived LSOAs.

5.2.2.2. Individual-level variables

Alcohol use

Self-reported alcohol use was the primary outcome of interest in the current study. This was assessed in Understanding Society using the Alcohol Use Disorders Identification Test – Consumption (AUDIT-C). First, participants were asked if they had consumed an alcoholic drink in the past 12 months (variable *auditc1*) and, if they responded ‘no’, they were then asked if they had always been a non-drinker (*auditc2*). Only participants who reported that they had drunk alcohol in the past year were administered the AUDIT-C. The AUDIT-C is a three-item screening tool that has good accuracy in detecting risky drinking and performs similarly to the full AUDIT (de Meneses-Gaya et al, 2009; Reinert & Allen, 2007). Questions included in the AUDIT-C are:

- Past year frequency of alcohol use (“Thinking about the past 12 months, how often do you have a drink containing alcohol?”)
- Typical quantity of alcohol consumed (“How many drinks do you have on a typical day when you are drinking?”)
- Binge drinking frequency (“How often have you had 6 or more units if female or 8 or more units if male on a single occasion in the last year?”).

Each item is scored on a Likert scale from 0 to 4, and scores are summed to provide a total AUDIT-C score. Total AUDIT-C scores range from 0-12, with higher scores indicating greater risk. Four drinking categories are derived from the total AUDIT-C score, non-drinkers or low risk (scores 0-4), increasing risk (scores 5-7), high risk (scores 8-10), and probable dependence (scores 11-12). For the current study, non-drinkers – who had missing AUDIT-C data but who indicated abstinence on the initial screening question (*auditc1*) – were given an AUDIT-C score of zero so that they could be included in analyses, thus maximising the analytic sample size. Previous work has also taken this approach by categorising participants with AUDIT-C scores of zero as non-drinkers (Foulds et al, 2013; Pearson et al, 2021).

The AUDIT-C was found to have acceptable internal consistency ($\alpha = 0.69$) in the current sample.

Perceived neighbourhood social cohesion

Perceived neighbourhood social cohesion was used as a cognitive measure of NSC at Wave 6 only. Two different tools were used in UKHLS to measure neighbourhood cohesion: an 8-item version of the Neighbourhood Cohesion Instrument (Buckner, 1988) and the 4-item questionnaire developed by Sampson et al (1997) for the Project on Human Development in Chicago Neighbourhoods (PHDCN). The current analyses use responses to the PHDCN tool (instead of Buckner's tool because) because the content focuses primarily on perceptions of neighbourhood dynamics (e.g. *"people in this neighbourhood..."*) rather than more egocentric evaluations of how one relates to other residents (e.g. *"I feel like..."*) as assessed by Buckner's tool. The former approach better aligns with the overall thesis and study objectives, which revolve around Putnam's conceptualisation of social capital as a community-level asset. Although the original tool consists of five questions, the UKHLS survey omits one item (*"people in this neighbourhood do not share the same values"*) but the rationale for this is unspecified in technical documents.

In the current study, neighbourhood social cohesion is assessed using four self-report items from the PHDCN (Sampson et al, 1997). Each item is rated on a 5-point Likert scale, whereby 1 indicates "strongly agree" and 5 indicates "strongly disagree". Higher scores indicate higher neighbourhood cohesion, and the items included are as follows:

- "This is a close-knit neighbourhood"
- "People around here are willing to help their neighbours"
- "People in this neighbourhood can be trusted"
- "People in this neighbourhood don't get along with each other".

The items are reverse-scored where necessary and are summed to give a total score ranging from 4 to 20. The PHDCN neighbourhood social cohesion scale had good internal consistency ($\alpha = 0.79$) in this sample. Given that there were a small number of participants residing in each LSOA and unequal distribution of participants across LSOAs, individual neighbourhood cohesion perceptions were not aggregated to the area-level and were therefore analysed as an individual-level variable only.

Structural social capital

Structural social capital was operationalised as membership of an organisations (yes or no) and whether participants had volunteered in the previous 12 months (yes or no). Participants

were shown a list of 15 organisations (plus the option for “other”) as a prompt to indicate whether they were currently members in those groups. Types of organisational membership include political, environmental, social/civic, voluntary, professional, religious, and sports associations. These measures were included only at Wave 6 and were included as two separate facets of structural social capital, rather than being collapsed into a single structural social capital measure.

Mental health

The 12-item General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988) is a screening tool used for identifying current mental disorder and psychological disturbances. The questions focus primarily on daily functioning and symptoms of distress. GHQ score at Wave 6 was used in current analyses as a pre-baseline predictor. Each item is (self-)rated along a 4-point scale, and assess: (a) ability to concentrate, (b) loss of sleep, (c) perceptions of whether one plays a useful role, (d) decision-making capability, (e) feeling constantly under strain, (f) problems overcoming difficulties, (g) enjoyment of day-to-day activities, (h) ability to face problems, (i) unhappiness and depression, (j) loss of confidence, (k) feeling worthless, and (l) general happiness.

Two different approaches to scoring are commonly adopted in studies utilising the GHQ and are available in UKHLS: the original bi-modal method (0-0-1-1) and the Likert (0-1-2-3) format. Bimodal scoring is more often used in clinical settings whereas Likert scoring is more suited to research (Anjara, Bonetto, Van Bortel & Brayne, 2020). Likert scoring is also suited for analyses of general population samples and longitudinal data as this approach is recommended for parametric data since it reduces skewness and is more sensitive to changes in distress over time than the bimodal approach (Banks et al, 1980). Hence, Likert scoring was employed in the current study.

Cronbach’s alpha indicated that the GHQ has excellent internal consistency ($\alpha = 0.90$) when assessed at both Wave 6 and at Wave 7.

Covariates

Data for socio-demographic correlates and other relevant factors were collected from Understanding Society participants. Those included in the current analyses were: age groups (categorised as 18-34, 35-49, 50-64, 65+), sex (male or female), educational attainment (as a binary variable, with “high” educational attainment including those who completed A-levels or

above and “low” educational attainment including those who have no formal qualifications or GCSEs/equivalent as their highest achieved qualifications), employment (employed or unemployed), marital status (married/civil partnership, single/never married, or divorced/widowed/separated), ethnicity (white or non-white), and urbanicity (rural or urban). Urbanicity was a dichotomous variable whereby participants were categorised as living in either an urban or rural area, in line with the Office for National Statistics’ (ONS) classification system (i.e. “urban” areas are those with a population of 10,000 or more).

5.2.3. Data preparation and handling missing data

Data cleaning and matching was conducted in STATA SE Version 17 (StataCorp, 2021). Participants were matched across waves using the unique, cross-wave identification codes and proxy responses were recoded as missing values. The datasets for each wave were cleaned and then merged on a one-to-one basis using this personal identifier. Composite variables for total AUDIT-C score were generated for each wave (except for pre-baseline) by summing the values for the three items. If there were missing values for any of the three AUDIT-C items, the variable was classed as missing for the participant at that wave. All participants missing an AUDIT-C score at Wave 7 were dropped to ensure that the analytic sample had full baseline data. In addition, all participants missing AUDIT-C data at both Waves 9 and 11 were dropped. This is because a minimum of two datapoints are required to assess linear change, i.e., drinking trajectories cannot be estimated from a single AUDIT-C score.

Chi-square tests and binary logistic regressions were conducted to investigate whether sociodemographic, neighbourhood factors, mental health, and baseline drinking characteristics predicted AUDIT-C missingness (Table 7 and Table 8). Significant associations between AUDIT-C missingness and all covariates confirm that the data was not missing completely at random (MCAR). In addition to the bivariate associations showing a systematic pattern of missingness, it was inferred that the data demonstrated a monotonic missingness pattern. This is reflected in Table 9, which shows that some extent of AUDIT-C missingness was due to attrition. Further investigation using the *“misstable patterns”* command in STATA confirmed this – revealing that 75% of the analytic sample responded at all four waves, 14% responded at the first three waves but dropped out at Wave 11, and other patterns of missingness were exhibited by <5% of the sample. Since individuals with missing data were not followed up between waves, it is not possible to confirm whether the data were missing at random (MAR) or missing not at random (MNAR). However, given that AUDIT-C missingness could be explained by observed covariates and participant drop-out, the data was assumed to

be MAR. Listwise deletion of participants with missing data is likely to introduce more severe bias than including incomplete cases under the assumption that the data is not MCAR (Enders & Bandalos, 2001). By default, the software used for analysis, LatentGOLD 6.0 (Vermunt & Magidson, 2021), excludes any cases with missing values so the “Include All” option for handling missing values was used. This enables incomplete cases to be included in the LCGA, which are handled directly by LatentGOLD’s likelihood function, and no imputation is required (Vermunt & Magidson, 2016). For participants with missing data, classification is based on the observed values – as is the case for participants without missing data (Vermunt & Magidson, 2016).

Separately, the IMD 2015 dataset was then merged with the protected UKHLS dataset (accessed via Special Licence) on a one-to-many basis, using the household identification codes. This allowed households included in UKHLS to be linked to their respective LSOAs and further matched to IMD score. The data were cleaned so that only English LSOAs were included (i.e., areas in Scotland, Wales and Northern Ireland were dropped). Finally, the two separate datasets (i.e., IMD/protected UKHLS and the combined, non-geocoded UKHLS waves) were merged on a one-to-many basis via the household identifier. This resulted in the final dataset. For analyses in LatentGOLD 6.0, data were reshaped from wide to long format, which generated an additional wave variable.

When missingness is greater than 10% for key variables, results are likely to be biased (Bennett, 2001), though the extent of bias may depend more so on the missingness mechanism (Dong & Peng, 2013). Only the three social capital indicators had >10% missing data in the analytic sample, which could be largely explained by non-response at Wave 6 and the UKHLS protocol with regards to the IEMB sample (detailed in Section 5.2.1.). Participants who were missing at Wave 6 and those who comprised the IEMB sample were removed for conditional analyses. In another study using UKHLS data, Bamford et al (2021) also took this approach and removed the IEMB sample because they were not administered important questions relevant to their analysis.

5.2.4. Statistical analysis

Latent class growth analyses were conducted using LatentGOLD 6.0 (Vermunt & Magidson, 2016; Vermunt & Magidson, 2021). Analyses were used to identify the optimal number of latent classes that best estimated distinct drinking trajectories in this sample, determined the accuracy of classification, and described latent class profiles. Multinomial logistic regressions

were then carried out to investigate predictors and covariates of latent class membership. Trajectory graphs were generated in SPSS Version 28 (IBM Corp., 2021).

Firstly, unconditional models with 1-8 latent classes were estimated with AUDIT-C total score as the (continuous) dependent variable at each survey wave. All models accounted for the multilevel design whereby AUDIT-C scores (level 1) were nested within individuals (level 2) who were nested within LSOAs (level 3). Unconditional models were re-estimated with and without equality constraints (i.e., with class-independent intercepts and slopes fixed at zero) to determine whether freeing the growth factors improved model fit. The conditional model was estimated via the bias-adjusted 3-step approach (Asparouhov & Muthén, 2014; Vermunt & Magidson, 2021) with proportional classification and BCH adjustment. This approach first involves selecting the unconditional model with the optimum number of latent trajectory classes based on AUDIT-C scores. In the second step, posterior probabilities (for class membership) are used to assign participants to latent trajectory classes. In the final step, associations between class membership and covariates are investigated via multinomial logistic regressions (or ANOVAs). The proportional (rather than modal) classification approach is advantageous due to recognition that individuals may have some probability of belonging to another class other than their modal assignment, thus accounting for classification error. The BCH approach also adjusts for misclassification via specialised weighting variables. Dummy coding was employed to ascertain the effects of nominal variables, and cases with missing values were included in analyses via LatentGOLD's maximum likelihood function. The first of these LCGA models (i.e., 1-class) is analogous to a latent growth curve model, which determines the overall means, intercept, and slope for the entire analytic sample. A final multinomial logistic regression was conducted using the bias-adjusted 3-step approach, which estimated whether trajectory class membership predicted mental health. For this analysis, posterior probabilities were used to predict GHQ scores at Wave 11. This analysis was also based on proportional classification and used BCH adjustment.

Model selection was driven by consideration of model fit statistics, as well as parsimony and interpretability. The model fit statistics of interest were Akaike's Information Criterion (AIC), Bayesian Information Criterion (BIC), Vuong-Lo-Mendell-Rubin (VLMR) likelihood ratio test value, classification error, and entropy R^2 . There are no established cut-offs for AIC or BIC, but lower values indicate better fit. The use of AIC and BIC as goodness of fit statistics were preferred over the more general Chi-square test due to the large size of the Understanding Society sample (i.e., risk of overpowering since Chi-square is more suited to smaller samples) and the complex, multivariate approach to SEM (i.e., introducing several latent variables into the model to define a range of constructs can result in inflated/unreliable Chi-square estimates

of model fit). VLMR values help determine whether the addition of one extra class improves model fit in comparison to the solution with one less class. Lower classification error and higher entropy values indicate better assignment to classes, whereby entropy values closer to 1 suggest greater precision. Posterior probabilities were also considered, which help demonstrate whether classes are adequately distinct from each other. In addition to consideration of model fit indices, more interpretable solutions were preferred over more complex models.

5.2.4.1. Sensitivity analyses

The COVID-19 pandemic led to the introduction of restrictions on social behaviours in the UK from March 2020. The drinking characteristics of Wave 11 participants (n=19,279) responding before and after this date were compared to assess whether there was an impact on responses. At Wave 11, 439 participants did not complete the AUDIT-C. There were significant differences between pre-COVID respondents (n=11,864) and those responding during the COVID pandemic (n=6,976) with respect to all drinking variables at Wave 11. Participants providing data from April 2020 onwards had lower overall AUDIT-C scores, were more likely to be non-drinkers, and were less likely to screen positive for risk drinking on the AUDIT-C (see Table 11). Other studies have also found that drinking behaviours changed during the COVID-19 pandemic, and that these changes were dependent on levels of consumption prior to the pandemic (Kilian et al, 2022). Note that Table 11 refers to the categories “positive screen for risk drinking” and “binge drinking”, which align with the original AUDIT-C classification system – i.e., they do not reflect latent classes derived from the current analyses.

Table 11 - Comparing Wave 11 participants who responded to AUDIT-C before and after March 2020

	March 2020 or earlier (n = 11,864)	April 2020 onwards (n = 6,976)	χ^2	p-value
Non-drinkers	2,306 (19.44%)	1,962 (28.13%)	189.24	<.01
Current drinkers	9,558 (80.56%)	5,014 (71.88%)		
Negative screen for risk drinking	8,667 (73.05%)	5,475 (78.48%)	69.21	<.01
Positive screen for risk drinking	3,197 (26.95%)	1,501 (21.52%)		
Total AUDIT-C score at Wave 11	3.11 (2.50)	2.66 (2.46)	216.09	<.01

The LCGA steps were repeated in the sub-sample of participants who responded after the implementation of COVID-19 restrictions, with most likely trajectory class membership as the outcome variable. This analysis also identified a six-class model as the optimal model when any classes containing less than 5% of the sample were rejected, and class sizes and interpretation of classes were comparable to the main analysis. Hence, the results reported in Section 5.3. pertain to all 22,880 adults that were eligible for inclusion in the study, regardless of whether they participated in Wave 11 of UKHLS before or after the COVID-19 restrictions were implanted.

A second sensitivity analysis was conducted to examine the potential impact of including mental health at Wave 6 rather than at Wave 7. The main analysis was conducted with GHQ scores reported at: (i) Wave 6, and (ii) Wave 7. This analysis was carried out because neighbourhood factors were assessed at a different wave (i.e., Wave 6) than all other covariates and baseline AUDIT-C (i.e., at Wave 7). The goal of this analysis was to determine whether concurrent assessments of mental health and neighbourhood factors as predictors (of latent class membership) improved model fit compared to staggered assessments (i.e., neighbourhood factors assessed in the wave prior to mental health versus neighbourhood factors assessed at the same timepoint as mental health).

5.3. Results

The analytic sample included 22,880 adult respondents living in England at Wave 7 of the UKHLS. Estimates reported hereafter are all unweighted and pertain to the analytic sample only, unless otherwise specified.

There were more females than males (56.34% and 43.66% respectively) and the majority of the sample were white (81.50%, compared to non-white: 18.50%). The most common age group was the 35-49 category (28.58%) but there were similar levels of representation across all age categories. Most respondents were married (56.95%), employed (60.51%), religious (55.46%) and had a university degree or higher (42.08%). With regards to individual social capital indicators, more than half of the sample reported having membership in an organisation (56.47%) while less than a quarter of respondents volunteered during the year prior to Wave 6 data collection (23.33%). A higher proportion of participants resided in neighbourhoods categorised as “low” (36.34%) and “moderate” (34.37%) deprivation compared to “high” (29.29%), based on English IMD tertiles (at Wave 6) reflective of the total UKHLS sample prior to data cleaning (i.e., participants from Waves 6, 7, 9 and 11 who lived in England at Wave 6).

Most respondents lived in urban areas (79.90%). See Table 6 for a full summary of pre-baseline (i.e., Wave 6) characteristics for the analytic sample in comparison to UKHLS participants who were excluded due to insufficient AUDIT-C data.

For the study population as a whole, alcohol use levels remained stable from Wave 7 to Wave 9 ($M = 3.11$ and 3.07 , respectively) and then decreased slightly at Wave 11 ($M = 2.89$). Unconditional fixed effects models (i.e., class-independent intercepts and slopes fixed at zero) were re-estimated with unconstrained growth factors (i.e., class-dependent intercepts and slopes, which were allowed to vary), akin to a growth mixture model. These models with unconstrained growth factors demonstrated better fit, hence the following sections refer to models with random intercepts and slopes.

5.3.1. Unconditional LCGA: Trajectory classes

The unconditional LCGA was analysed with the entire sample of 22,880 participants. Model fit statistics initially suggested that a 7-class model was optimal, for which there was an inflection point in AIC and BIC (see Table 12). However, this model was rejected in favour of a 6-class model since the seventh class only contained a very small proportion (2.52%) of the sample and there was no strong theoretical justification to include them. The inclusion of a seventh class did not add substantive value as it closely resembled another larger class that reflected low-risk drinking, which confirmed selection of the 6-class model based on better interpretability and parsimony. Classification error for the 6-class solution was slightly below par (0.14) but entropy statistics were acceptable (>0.80), indicating adequate class separation. Wald statistics were significant for all paired comparisons ($p < .05$) with regards to the intercept, which confirmed that the classes were distinct from one another. There was only one paired comparison that was non-significant for the slope (i.e., “wave” as a nominal predictor). This was not considered to be problematic because these classes could be easily differentiated by their alcohol consumption levels (i.e., moderate vs. high-risk drinking). Overall, model selection was based on a compromise between model fit statistics, parsimony (i.e., fewer parameters), and substantive interpretation.

Table 12 - *Goodness-of-fit statistics for unconditional multilevel models with 1-8 latent classes*

	LL	BIC(LL)	AIC(LL)	VLMR	p-value	Class. Error	Entropy R ²	R ²
1-class	-147974.8688	295989.8896	295957.7376			0.0000	1.0000	0.0008
2-class	-97239.7416	194569.8254	194497.4833	101470.2543	0.0000	0.0000	1.0000	0.2896
3-class	-83546.6039	167233.7402	167121.2079	27386.2754	0.0000	0.0470	0.8892	0.7222
4-class	-77507.6774	155206.0772	155053.3549	12077.8530	0.0000	0.0736	0.8681	0.8196
5-class	-75148.0277	150536.9678	150344.0553	4719.2995	0.0000	0.1138	0.8252	0.8249
6-class	-73324.1188	146939.3402	146706.2376	3647.8177	0.0000	0.1400	0.8055	0.8547
7-class	-68286.0575	136913.4076	136640.1150	10076.1226	0.0002	0.1395	0.8150	0.8587
8-class	-70837.0011	142065.4849	141752.0022	-5101.8872	1.0000	0.1924	0.7563	0.8628

The 6-class model comprised six distinct trajectory groups, listed here in order of increasing risk: “non-drinkers” (17.32%); “very-low-level drinkers” (11.63%); “low-level drinkers” (24.54%); “moderate drinkers” (14.40%); “borderliners” (24.65%); and “high-risk drinkers” (7.46%). Class names represent the classes’ AUDIT-C scores. The “borderliners” and “low-level drinkers” comprised approximately half of the entire sample and were the largest classes. The class described as “borderliners” was named as such to reflect AUDIT-C scores of approximately five at every wave when rounded to be an integer. Scoring between 5-12 on the AUDIT-C indicates a positive screen for risky drinking but, given that individual AUDIT-C scores vary around the grand mean, labelling this class as “risky drinkers” was considered misleading. Figure 6 shows the group-based alcohol use trajectories from Wave 7 to Wave 11.

Non-drinkers had an overall AUDIT-C score of zero at every timepoint. “Very-low-level drinkers” had a mean AUDIT-C score of 0.97 at Wave 7 and 0.78 at Wave 11. For “low-level drinkers”, average AUDIT-C score fell from 2.34 at Wave 7 to 1.99 at Wave 11. “Moderate drinkers” had an average AUDIT-C score of 3.76 at baseline and 3.69 at Wave 11. The average AUDIT-C score at Wave 7 for “borderliners” was 5.28, which decreased to 4.87 at Wave 11. The final and smallest class of high-risk-stable drinkers had AUDIT-C scores of 7.75 and 7.78 at Wave 7 and Wave 11 respectively.

Figure 6 - Group-based AUDIT-C trajectories by wave

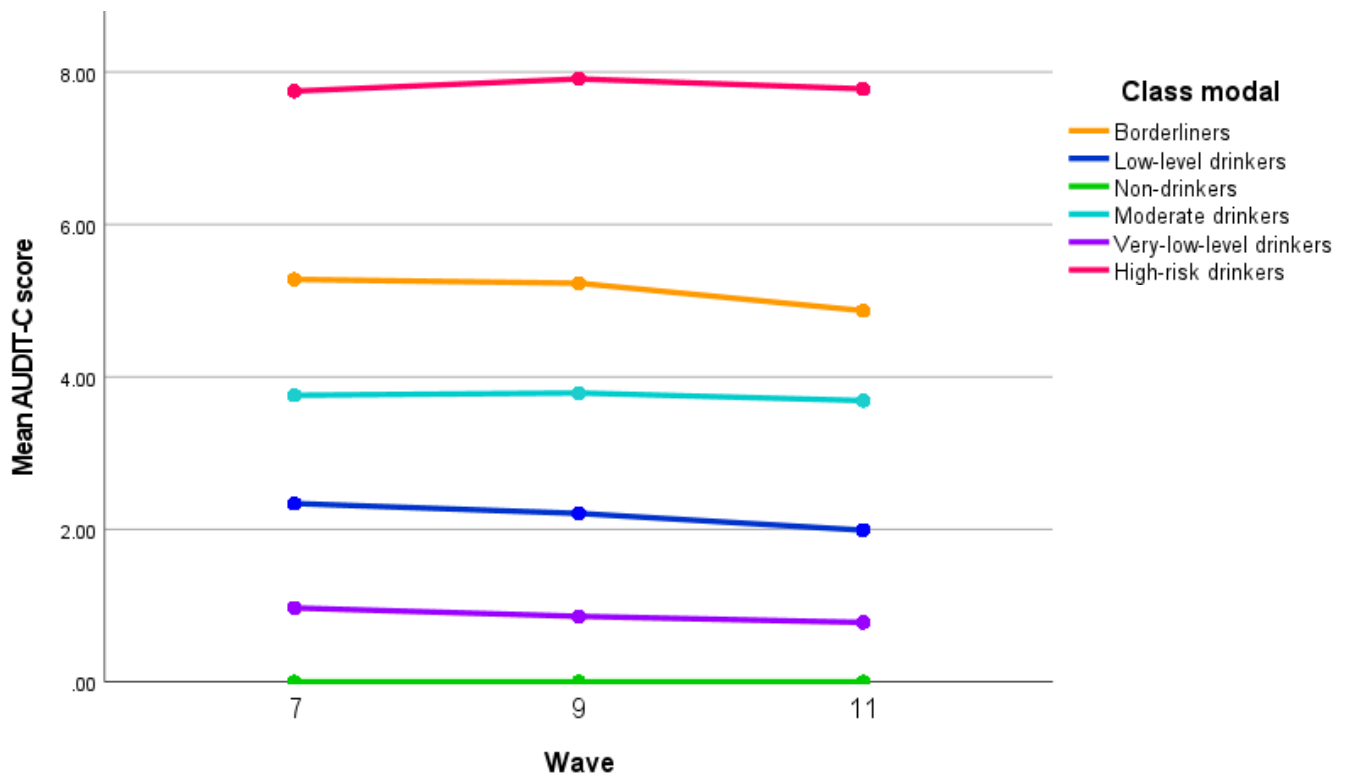


Table 13 presents the distribution of AUDIT-C item-wise responses for each of the six classes from the unconditional model (N=22,880) at baseline and Wave 11. Drinking characteristics of the trajectory classes are reported in this section with reference to the modal response, per AUDIT-C item, for each class.

The entire class of “non-drinkers” consistently reported never binge drinking at both Wave 7 and Wave 11. All “non-drinkers” reported “never” to drinking alcohol in the past year at Wave 7 but a very small proportion (0.17%) reported low-quantity (0-2 drinks) drinking at Wave 11. “Very-low-level drinkers” mostly drank less than monthly and had 0-2 drinks on a typical drinking day. Only a small proportion of this class binge drank (less than monthly), which decreased from 8.53% at Wave 7 to 2.72% at Wave 11. “Low-level drinkers” most often reported drinking 0-2 drinks between 2-4 times per month and never binge drinking. The proportion of those who did report binge drinking decreased from 39.02% at Wave 7 to 25.99% at Wave 11. “Moderate drinkers” typically drank 0-2 drinks 2-3 times per week and would binge drink less than monthly. “Borderliners” were the only class whose modal responses to AUDIT-C items changed across the study period. At both Wave 7 and Wave 11, they typically drank 2-3 times per week. Their modal quantity per drinking day decreased from 3-4 drinks at Wave 7 to 0-2 drinks at Wave 11, however, the proportion of those consuming 3-4 drinks on a typical

drinking day remained stable from Wave 7 (41.66%) to Wave 11 (41.25%). Their modal response for binge drinking frequency changed from monthly to less than monthly. At both timepoints, “high-risk drinkers” most commonly reported consuming 4+ drinks on a typical drinking day, drinking 3-4 times per week, and binge drinking weekly.

Table 13 - Drinking characteristics of the trajectory classes at baseline and Wave 11^a

		Non-drinkers		Very-low-level drinkers		Low-level drinkers		Moderate drinkers		Borderliners		High-risk drinkers	
AUDIT-C item		Wave 7 (N = 3,962)	Wave 11 ^b	Wave 7 (N = 2,850)	Wave 11 ^c	Wave 7 (N = 5,777)	Wave 11 ^d	Wave 7 (N = 3,198)	Wave 11 ^e	Wave 7 (N = 5,478)	Wave 11 ^f	Wave 7 (N = 1,615)	Wave 11 ^g
(1) Drinking frequency	Never	3,962 (100)	2,952 (99.83)	650 (22.81)	778 (31.59)	312 (5.40)	455 (9.45)	0	0	54 (0.99)	103 (2.23)	0	0
	Monthly or less	0	4 (0.14)	1,985 (69.65)	1,537 (62.40)	1,957 (33.88)	1,583 (32.89)	329 (10.29)	231 (8.51)	455 (8.31)	412 (8.92)	12 (0.74)	9 (0.66)
	2-4 times per month	0	1 (0.03)	215 (7.54)	148 (6.01)	2,437 (42.18)	1,898 (39.43)	941 (29.42)	719 (26.47)	1,301 (23.75)	953 (20.63)	133 (8.24)	91 (6.64)
	2-3 times per week	0	0	0	0	991 (17.15)	814 (16.91)	1,305 (40.81)	1,182 (43.52)	2,229 (40.69)	1,800 (38.96)	558 (34.55)	418 (30.49)
	4+ times per week	0	0	0	0	80 (1.38)	63 (1.31)	623 (19.48)	231 (8.51)	1,439 (26.27)	1,352 (29.26)	912 (56.47)	853 (62.22)
		3,962 (100)	2,949 (100)	2,818 (98.88)	2,442 (99.31)	4,801 (83.11)	4,274 (89.19)	2,186 (68.36)	1,977 (72.93)	2,140 (39.07)	2,078 (45.07)	138 (8.54)	91 (6.68)
(2) Drinks on a typical drinking day	0-2			32 (1.12)	17 (0.69)	814 (14.09)	463 (9.66)	842 (26.33)	621 (22.91)	2,282 (41.66)	1,902 (41.25)	714 (44.21)	647 (47.47)
	3-4	0	0	0	0	135 (2.34)	51 (1.06)	155 (4.85)	106 (3.91)	724 (13.22)	465 (10.08)	475 (29.41)	411 (30.15)
	5-6	0	0	0	0	20 (0.35)	3 (0.06)	15 (0.47)	7 (0.26)	221 (4.03)	108 (2.34)	187 (11.58)	10.12 (138)
	7-9	0	0	0	0					111 (2.03)	58 (1.26)	101 (6.25)	76 (5.58)
	10+	0	0	0	0	7 (0.12)	1 (0.02)	0	0				
(3) Binge drinking frequency	Never	3,962 (100)	2,955 (100)	2,607 (91.47)	2,393 (97.28)	3,523 (60.98)	3,563 (74.01)	1,121 (35.05)	1,073 (39.58)	522 (9.53)	782 (17.01)	15 (0.93)	15 (1.10)
	Less than monthly	0	0	243 (8.53)	67 (2.72)	1,993 (34.50)	1,191 (24.74)	1,775 (55.50)	1,516 (55.92)	1,926 (35.16)	1,923 (41.84)	70 (4.33)	77 (5.65)
	Monthly	0	0	0	0	231 (4.00)	56 (1.16)	290 (9.07)	120 (4.43)	1,932 (35.27)	1,341 (29.18)	310 (19.20)	282 (20.69)
	Weekly	0	0	0	0	27 (0.47)	2 (0.04)	11 (0.34)	1 (0.04)	1,007 (18.38)	529 (11.51)	980 (60.68)	789 (57.89)
	Daily or almost daily	0	0	0	0	3 (0.05)	2 (0.04)	1 (0.03)	1 (0.04)	91 (1.66)	21 (0.46)	240 (14.86)	200 (14.67)

^aThese proportions are based on the sample for the unconditional model, using complete data only. Item-wise modal AUDIT-C responses for each class are in bold.

^bN=2,957 for item 1; N=2,949 for item 2; N=2,955 for item 3

^cN=2,463 for item 1; N=2,459 for item 2; N=2,460 for item 3

^dN=4,813 for item 1; N=4,792 for item 2; N=4,814 for item 3

^eN=2,716 for item 1; N=2,711 for item 2; N=2,711 for item 3

^fN=4,620 for item 1; N=4,611 for item 2; N=4,596 for item 3

^gN=1,371 for item 1; N=1,363 for item 2; N=1,363 for item 3

5.3.2. Conditional LCGA: Predictors and covariates of class membership

The conditional analyses were based on a restricted sample of 19,940 participants due to the exclusion of the IEMB sample and participants who did not report living in England at Wave 6 (i.e., the time at which neighbourhood factors were assessed). Covariates (including predictors) of trajectory class membership were analysed via multinomial logistic regression. All covariates had significant associations with trajectory class membership, with Wald statistics observed at a significance level of $p < .05$ (Table 15). Interpretation of covariate effect sizes was guided by Cohen's (1988, 1992) recommended thresholds of .10 for small effects, .30 for medium effects, and .50 for large effects. Class profiles are presented in Table 13 and Table 15. Despite trajectory class membership being significantly associated with mental health and neighbourhood social cohesion overall, effect sizes were small ($\beta < .10$) for all six classes. Given that these variables (along with indicators of structural social capital) were theorised to be potential predictors of class membership, paired comparisons were also inspected. "Borderliners" served as the reference group because they comprised the largest class, thus representing the population norm, and this facilitated interpretation of beta coefficients. All associations with covariates reported in this section are relative to this reference group and class profiles are described here in order of increasing alcohol use severity.

i) "Non-drinkers" were more likely to be female and in the 35-49 and 65+ age categories. Membership in this class was associated with a higher likelihood of being married or being divorced vs being single, and having lower educational attainment (18.96% had no qualifications). They were less likely to be in the highest income tertile and much more likely than "borderliners" (and any other class) to be non-white, religious, unemployed, and to reside in neighbourhoods categorised in the highest deprivation tertile. This class was the least likely to report organisational membership (i.e., significantly lower proportion indicating that they are members of an organisation than any other class), whereas there were only very weak effect sizes associated with volunteering and urbanicity. "Non-drinkers" also had the highest mean GHQ score (i.e., worst mental health) overall, which was significantly higher than those for "borderliners", "low-level drinkers" and "moderate drinkers". Mental health for this class was comparable with the mental health of "very-low-level drinkers" and "high-risk drinkers".

ii) "Very-low-level drinkers" were more likely than "borderliners" to be older (i.e., in age categories other than 18-34), female, non-white, religious, unemployed, and divorced. They typically had a lower income (i.e., less likely to be in the second and third income tertiles) and

were more likely to reside in areas characterised by moderate and high deprivation (compared to low deprivation). There was a weak association with urbanicity, whereby “very-low-level drinkers” were more likely to reside in urban (vs rural) areas. This class was less likely to report having membership in an organisation while there was only a very weak effect size associated with volunteering. The only significant paired comparisons for neighbourhood social cohesion were those of “very-low-level drinkers” with “borderliners”, “moderate drinkers” and “high-risk drinkers”. “Very-low-level drinkers” had lower neighbourhood social cohesion than these groups on average, and had the lowest overall score second to “non-drinkers”.

iii) “Low-level drinkers” were more likely to be female, non-white and in the 65+ age group. Membership in this class was associated with being either married or divorced (vs being single) as well as a lower likelihood of being in the highest income tertile. There were mixed and weak effects of structural social capital variables, whereby “low-level drinkers” were less likely to be members of an organisation but were more likely to have volunteered. There were only very small effects associated with unemployment, urbanicity and neighbourhood deprivation.

iv) “Moderate drinkers” were more likely to be female, older (aged 50+), married or divorced (vs being single), and white, compared to “borderliners”. They were more likely to have obtained a university degree or higher and were less likely to report any other type of qualification as their highest educational attainment. Individuals in this class were less likely to report living in the most deprived neighbourhoods and were more likely to report both organisational membership and volunteering. Compared to all other classes, “moderate drinkers” had significantly higher levels of organisational membership (except for paired comparisons with “borderliners”) and volunteering (except for paired comparisons with “low-level drinkers”). “Moderate drinkers” also had significantly better mental health than any other class. Only very weak effects of religiosity, unemployment, urbanicity and income were observed.

v) “High-risk drinkers” were older than “borderliners” (i.e., less likely to be in the 18-34 age group) and less likely to be married. Membership of this class was associated with being white, unemployed and in the highest income tertile. “High-risk drinkers” were less likely to have no qualifications but also less likely to have achieved a degree or higher. This class had a much higher likelihood of being male and non-religious than any other class. They were more likely to live in urban (rather than rural) areas but other neighbourhood contextual and social capital factors had very little association with class membership. Paired comparisons revealed that

“high-risk drinkers” differed significantly from “borderliners” and “low-level drinkers” with regards to mental health, for which they had higher GHQ scores on average.

5.3.3. Sensitivity analyses

5.3.3.1. Comparing models with pre-baseline versus concurrent assessment of mental health

The conditional model, which included the measure of mental health at Wave 7, was re-estimated with mental health assessed at Wave 6 instead. This comparison was conducted because prior research suggests a bidirectional relationship between alcohol use and mental health (Bell & Britton, 2014), so it was important to examine whether including an earlier baseline measure of mental health (i.e. Wave 6) provided better model fit. Including a measure of mental health at Wave 6 that aligned with assessment of neighbourhood factors rather than with baseline AUDIT-C (at Wave 7) had minimal impact on model parameters. Model fit statistics (Table 14) showed that including mental health at Wave 6 led to a slightly poorer model fit, which confirmed that the conditional model presented in Section 5.3.2. was the optimal model.

Table 14 - Comparison of goodness-of-fit statistics for models that include mental health assessed at Wave 7 and at Wave 6

	LL	BIC(LL)	AIC(LL)	Npar	Class.Err.	Entropy R ²
Conditional LCGA with GHQ at wave 7	-30622.7879	62384.1314	61475.5758	61590.5758	0.6429	0.1033
Conditional LCGA with GHQ at wave 6	-30632.5653	62403.6861	61495.1305	61610.1305	0.6430	0.1030

Table 15 - Beta coefficients and standard errors for trajectory class characteristics analysed via multinomial logistic regression of latent class membership and covariates (reference group = “borderliners”)

	Non-drinkers		Very-low-level drinkers		Low-level drinkers		Moderate drinkers		High-risk drinkers			
	β	SE	β	SE	β	SE	β	SE	β	SE	Wald	p-value
Intercept	-2.74***	0.25	-1.94***	0.26	-0.36	0.21	-0.51	0.29	-2.34***	0.32	191.11	<.01
Age (ref = 18-34)	***		***		***		***		***		334.75	<.01
35-49	0.17	0.09	0.54	0.11	-0.03	0.07	0.05	0.10	0.80	0.12		
50-64	0.05	0.09	0.80	0.11	0.10	0.08	0.26	0.11	0.90	0.12		
65+	0.53	0.12	1.44	0.13	0.79	0.10	1.03	0.14	0.28	0.18		
Gender (ref = male)											537.73	<.01
Female	0.53***	0.06	0.87***	0.07	0.55***	0.05	0.46***	0.07	-0.79***	0.08		
Ethnicity (ref = white)											1546.63	<.01
Non-white	2.55***	0.09	1.01***	0.10	0.74***	0.09	-0.40*	0.18	-0.69**	0.21		
Employment status (ref = employed)											112.44	<.01
Unemployed	0.69***	0.08	0.22**	0.08	<.01	0.07	0.01	0.10	0.11	0.11		
Educational attainment (ref = degree or higher)	***						***				225.02	<.01
Post-secondary (e.g. A levels)	-0.04	0.08	-0.20	0.09	-0.10	0.06	-0.40	0.09	0.15	0.10		
Secondary (e.g. GCSEs)	0.21	0.08	-0.02	0.09	-0.01	0.07	-0.40	0.09	0.18	0.10		
Other qualification	0.42	0.11	0.03	0.11	0.07	0.10	-0.48	0.14	0.16	0.15		
No qualification	0.82	0.11	0.12	0.12	-0.01	0.11	-0.96	0.18	-0.19	0.20		
Marital status (ref = single/never married)	***		***		***		***		**		140.96	<.01
Married/	0.50	0.08	0.08	0.08	0.21	0.06	0.38	0.09	-0.25	0.09		
Divorced/widowed/ separated	0.80	0.11	0.50	0.11	0.30	0.09	0.22	0.13	0.08	0.14		
Religiosity (ref = yes, religious)											182.94	<.01
No, not religious	-0.66***	0.06	-0.37***	0.07	-0.18***	0.05	0.05	0.07	0.25**	0.08		
Income (ref = low)	***		***		***						108.61	<.01
Medium	0.02	0.07	-0.11	0.08	0.06	0.06	-0.04	0.09	0.05	0.11		
High	-0.52	0.09	-0.45	0.09	-0.18	0.07	-0.02	0.10	0.20	0.12		
GHQ-12	0.02***	0.01	0.01	0.01	<.01	<.01	-0.02***	0.01	0.02**	0.01	54.06	<.01
Urbanicity											15.15	<.01

(ref = rural)												
Urban	0.06	0.08	0.15*	0.08	0.08	0.06	-0.03	0.07	0.28**	0.09		
Neighbourhood deprivation (ref = low)	***		**				***				172.84	<.01
Moderate	0.31	0.07	0.19	0.07	0.03	0.06	-0.05	0.07	0.09	0.08		
High	0.73	0.08	0.26	0.08	0.06	0.07	-0.38	0.10	0.08	0.10		
Membership in organisation(s) (ref = yes)											68.57	<.01
No	0.41***	0.06	0.11	0.07	0.11*	0.05	-0.14	0.08	0.04	0.08		
Volunteered (ref = yes)											23.13	<.01
No	-0.07	0.07	0.01	0.08	-0.18**	0.06	-0.26***	0.08	0.03	0.10		
Neighbourhood social cohesion	-0.01	0.01	-0.03*	0.01	-0.02	0.01	<.01	0.01	0.01	0.02	11.23	<.05

Beta coefficients showing a significant difference from the reference group are in bold

* = $p < .05$

** = $p < .01$

*** = $p < .001$

5.3.3.2. Ad-hoc analysis: Re-estimating the unconditional model with only participants who screened positive (5+) on the AUDIT-C at Wave 7

An ad-hoc analysis was conducted using only participants who screened positive for risky drinking on the AUDIT-C (scoring 5+) at Wave 7 (N=6,405). This analysis was conducted because all classes identified by the unconditional model exhibited little change in alcohol use over the study period. This was considered to be due to the use of a general population sample, combined with a preference for parsimonious models that do not include classes containing <5% of the sample. Since alcohol use is generally stable in adulthood, particularly amongst non-risky drinkers (Knott, Bell & Britton, 2017), it is likely that only very small proportions of the general population will change their consumption considerably over this study period, which was not detected in unconditional models 1-8 using the full analytic sample. The rationale for restricting the sample to individuals with a positive AUDIT-C screen at Wave 7 is that higher-severity alcohol use is associated with greater readiness to change (Williams et al, 2006), which is associated with subsequent drinking reductions (Gaume, Bertholet & Daepfen, 2017), whereas some individuals maintain high levels of use over time that are conducive to health harms. This analysis involved re-estimating and comparing unconditional models with 1-8 latent trajectory classes for this sub-sample, in order to examine heterogeneity within risky drinkers. There was an inflection at a 6-class solution for both AIC and BIC but model fit was poor, given that class error was 18.90% and entropy was <.80 (Table 16). No conditional analysis was therefore conducted with this sub-sample due to poor model fit.

Table 16 - Model fit statistics for unconditional models with 1-8 classes for the sub-sample of participants screening positive on the AUDIT-C at Wave 7

	BIC(LL)	AIC(LL)	VLMR	p-value	Class.Err.	Entropy R ²	R ²
1-Class	72820.0338	72792.9745			0.0000	1.0000	0.0434
2-Class	69012.6772	68951.7937	3851.1808	0.0000	0.0914	0.6782	0.5498
3-Class	67374.8438	67280.1361	1681.6575	0.0000	0.1281	0.6825	0.6343
4-Class	66406.6892	66278.1574	1011.9788	0.0000	0.1703	0.6637	0.6983
5-Class	66057.6526	65895.2966	392.8608	0.0000	0.2023	0.6541	0.7109
6-Class	62409.8490	62213.6688	3691.6278	0.0000	0.1890	0.6927	0.7191
7-Class	65671.9933	65441.9889	-3218.3201	1.0000	0.2486	0.6280	0.7479
8-Class	65590.3710	65326.5425	125.4464	0.0001	0.2771	0.6076	0.7524

5.3.4. Alcohol trajectory class membership as a predictor of mental health

The overall sample mean GHQ score increased from 10.84 at Wave 7 to 11.59 at Wave 11. Trajectory class membership was significantly associated with mental health at Wave 11 ($Wald = 95.44, p < .01$) and all classes exhibited an increase in mean GHQ score from Wave 7 to Wave 11 (Table 17). Mental health at Wave 11 for “borderliners” differed significantly from that of “non-drinkers” and “moderate drinkers”, but not from any of the other classes. “Borderliners” had significantly worse mental health (at Wave 11) compared to “moderate drinkers” but significantly better mental health than “non-drinkers”. At Wave 11, “moderate drinkers” had significantly better mental health than all other classes whereas “non-drinkers” had significantly worse mental health than any other class.

Table 17 - *Distribution of mean GHQ scores between trajectory classes*

	Non-drinkers	Very-low-level drinkers	Low-level drinkers	Moderate drinkers	Borderliners	High-risk drinkers	Wave mean
Wave 6	11.39	10.93	10.90	9.78	10.63	11.06	10.78
Wave 7	11.55	11.21	10.86	9.96	10.68	11.14	10.84
Wave 11	12.32	11.78	11.70	10.63	11.52	11.73	11.59

5.4. Discussion

This study aimed to identify and characterise latent trajectory classes based on alcohol use in a nationally representative sample of the English population. Participants were assigned to six distinct groups that were named according to their level of alcohol consumption and pattern of use over time: “non-drinkers”, “very-low-level drinkers”, “low-level drinkers”, “moderate drinkers”, “borderliners”, and “high-risk drinkers”. All groups exhibited relatively stable alcohol use levels between Wave 7 (2014/2016) and Wave 11 (2019/2021), while mental health deteriorated over time for all classes. Class membership was associated with mental health at both Wave 7 and Wave 11 mental health. “Moderate drinkers” were less likely to reside in disadvantaged areas, had the lowest levels of psychological distress and has the highest levels of both structural and cognitive social capital. “Non-drinkers” had the highest levels of distress and were more likely to reside in disadvantaged areas compared to other classes. Structural and cognitive social capital indicators were associated with class membership, but stronger relationships were observed for structural social capital indicators.

Previous studies that have used latent class modelling techniques to examine differences in alcohol consumption profiles have generally settled on solutions with three to six classes (Beseler et al, 2012; Smith & Shevlin, 2008). The model selected in the current study is consistent with this, but comparison with prior literature is difficult due to different populations and latent class indicators. Furthermore, prior latent class analyses have mostly focused on profiling groups who meet criteria for AUD (Beseler et al, 2012; Moss et al, 2007; Müller et al, 2020). A similar UK study identified six drinker subgroups in a nationally representative sample (Smith & Shevlin, 2008). The six classes included three heavy consumption groups, one moderate consumption group, and two mild consumption groups (Smith & Shevlin, 2008). The most prevalent class found by Smith & Shevlin (2008) is somewhat comparable to the most prevalent class found in the current study as they both represent moderate drinking with a moderate probability of binge drinking and lower probability of depressive symptoms compared to the lowest-level drinkers. In contrast, the 6-class model estimated in the present study only identified one heavy consumption group in addition to one group whose alcohol consumption was on the borderline of the cut-off for risky drinking. It is also important to note that one class was characterised by total abstinence so current results, in effect, represent a 5-class model of current drinkers. Despite similarities with Smith & Shevlins' (2008) sample and approach, possible reasons for inconsistent findings are that their study was cross-sectional and used the full version of the AUDIT.

Current results are somewhat more consistent with the 5-class LCGA structure proposed by Szabó et al (2021) who similarly found that all classes exhibited either stable or declining drinking trajectories. Szabó and colleagues (2021) identified two "potentially hazardous" classes, which reflect the "high-risk drinkers" and "borderliners" groups to some degree. They further identified two moderate-drinker groups and another low-risk group, which again is comparable to the current study. However, the model proposed by Szabo et al (2021) is only applicable to a sample of older adults (aged 55-70) living in New Zealand. Harmonised data from nine UK cohort studies demonstrated a gradual decline in alcohol consumption in older age (i.e., after approximately aged 60) following a period of stable use in mid-life (Britton, Ben-Shlomo, Benzeval, Kuh & Bell, 2015). Nonetheless, these combined findings suggest that AUDIT-C may be reliably used for LCGA to identify subgroups of drinkers across the spectrum in general population samples. Current findings also support a previous US study spanning a nine-year period that used latent transition analysis (which allows individuals to move between classes over time) and found drinking patterns remained relatively stable after adolescence (Hoyland & Latendresse, 2018), similar to the plateauing trajectories found in the UK by Britton et al (2015).

Class sizes reported here are somewhat comparable to 2021 prevalence statistics for England, which show that approximately 57% of the population drink in line with the Chief Medical Officers' recommended drinking guidelines and 21% exceed recommended drinking limits (NHS Digital, 2022). This compares with 50.57% and 32.11% of the current sample whose trajectory classes' average scores indicated a negative screen (i.e., "very-low-level drinkers", "low-level drinkers", and "moderate drinkers") and positive screen (i.e., "borderliners" and "high-risk drinkers") for risk drinking, respectively. "Non-drinkers" comprised only 17.32% of the current sample, which is lower than the estimated 21% of non-drinkers in the Health Survey for England (NHS Digital, 2022). This may be due to over-representation of individuals living in more affluent areas (in the present study), who are found to have lower rates of non-drinking (11%) compared to lower-income populations (33%; NHS Digital, 2022). Under-representation of non-White participants and exclusion of the IEMB sub-sample may also explain the lower rates of non-drinking as these populations typically have lower alcohol consumption and higher rates of abstinence (Hurcombe, Bayley & Goodman, 2010). Therefore, data preparation for the current analyses may have impacted the findings, especially because of excluding participants who did not have data at multiple waves. Attrition is common in longitudinal studies despite improvements in retention strategies (Teague et al, 2018).

The alcohol use patterns identified in this study that exhibit slight decreases over the study period may reflect evidence of Skog's theory of collective drinking (Skog, 1985). The theory suggests that changes in population mean alcohol consumption coincide with collective shifts in drinking that occur across the entire distribution of drinkers, at all severity levels. It is theorised that social mechanisms (i.e., social interaction among members of a society and social controls) underlie this phenomenon, which may help explain the effects of neighbourhood social cohesion found in the current study. For example, regular positive interactions between neighbours could promote social contagion of alcohol use patterns that converge towards community drinking norms, whereas informal social control (e.g. neighbours expressing disapproval or concern towards drunkenness) could discourage excessive drinking and, again, help shift polarised drinking behaviours towards the norm. However, the theory has been criticised for being "vague" and failing to explain why drinkers along the severity spectrum do not respond uniformly to changes in the population alcohol consumption mean – particularly heavier drinkers, who may be less susceptible to societal changes in overall alcohol consumption (Raninen & Livingston, 2020). Recent English data partially supports Skog's hypothesis but suggests that collectively operates via "hard" (no differences between consumption quantiles) and "soft" (differences between quantiles but change in consumption

shifts in the same direction for all) processes and alongside polarisation of drinking habits (Holmes et al, 2019).

The steeper decline between 2017/2019 (Waves 9) and 2019/2021 (Wave 11) could highlight the impact of the COVID-19 pandemic, which reportedly led to polarisation of drinking habits in the UK (Garnett et al, 2021). Although alcohol use in on-trade venues decreased during the pandemic, drinking at home increased (Hardie, Stevely, Sasso, Meier & Holmes, 2022). This may explain why, unlike most other classes, “high-risk drinkers” did not decrease their alcohol use by Wave 11, as solitary home drinking is associated with higher-severity alcohol consumption compared to many social drinking scenarios (Davies, Cooke, Maier, Winstock & Ferris, 2021; Skrzynski & Creswell, 2020). The stability of high-risk drinking in the smallest, most severe class is also in line with findings from the Adult Psychiatric Morbidity Survey (APMS) 2014 (McManus et al, 2016), which reports stable levels of harmful/dependent drinking alongside declining rates of hazardous drinking (mostly among men). The “borderliners” class may be better understood as hazardous drinkers who decreased their drinking to safer levels, since their profile matches the characteristics of hazardous drinkers as reported in APMS 2014 (McManus et al, 2016). In line with previous research, both “borderliners” and “high-risk drinkers” were more likely to be male (McManus et al, 2016). The profiles of “very-low-level drinkers” and “low-level drinkers” are consistent with previous papers suggesting that low-risk drinkers are more likely to be older and female (Sacco, Bucholz & Spitznagel, 2009; Skogen et al, 2019). Conditional (i.e., covariate) analyses suggest that higher SES and (structural) social capital may be associated with drinking reductions in those who drink at moderate levels.

Neighbourhood social cohesion had minimal association with class membership, but “moderate drinkers” had the highest overall levels of all social capital indicators. This echoes previous findings pointing to the “dark side” of social capital, which posits that social connection can perpetuate health risk behaviours such as alcohol consumption (Villalonga-Olives & Kawachi, 2017). However, the results generally support the view that neighbourhood social cohesion may be positively associated with alcohol use and binge drinking but protective against higher risk drinking, as seen in AUD (Dupuis et al, 2016) – reinforcing that the relationship between neighbourhood cohesion and alcohol use may be non-linear (Kuipers et al, 2012). Past-year volunteering also had some explanatory value and was more strongly associated with class membership than neighbourhood cohesion. Furthermore, there were even larger differences between trajectory groups with regards to membership in organisations, with all current-drinker classes being more likely than “non-drinkers” to have reported organisational membership. Together, these results support previous claims that

structural social capital (i.e., organisational membership and volunteering in this study) is more relevant to alcohol use than cognitive social capital (i.e., neighbourhood social cohesion in this study) (Larm et al, 2016). One explanation for this is that it is very common in England for social gatherings to involve alcohol, and so these forms of (structural) social capital confer greater opportunities for drinking (Holmes et al, 2024).

The association between mental health and class membership was very weak. “Non-drinkers” reported levels of distress comparable to the “very-low-level drinkers” and “high-risk drinkers”, and had substantially worse mental health than the remaining groups. This corroborates a recent analysis of another English (adult) general population sample, which found a higher prevalence of non-drinking among individuals with mental disorder compared to those without, even after adjusting for socioeconomic and demographic factors (Puddephatt et al, 2021). Non-drinkers in the current study reported lower levels of (structural) social capital compared to the current-drinker groups. The protective role of social support in the context of mental health is widely established (Gariépy et al, 2016; Wang, Mann, Lloyd-Evans, Ma & Johnson, 2018), with social capital providing a means for stress-buffering, emotional regulation, social enrichment, and improving psychosocial skills and self-esteem (Lakey & Orehek, 2011; also see Study 1 Section 4.5.). A large amount of research suggests a J-shaped curve characterises the relationship between alcohol use and mortality (Castelnuovo et al, 2006), so the current study offers insight into the potential role of undesirable neighbourhood environments and loneliness in explaining this trend. Perhaps low to moderate drinking coincides with a richer social life that confers health benefits. Alternatively, the J-shaped curve might instead reflect the “sick quitter” hypothesis (Sarich et al, 2024) or tendency for abstainers to have poorer health, which makes it seem as though low-level drinking “improves” health.

Non-drinking populations have also reported being stigmatised and excluded for their lack of alcohol involvement, feeling the need to participate in drinking to accommodate drinkers or avoid being questioned, or being pressured to drink (Katainen, Härkönen & Mäkelä, 2022). These negative consequences of non-drinking might discourage attendance at social gatherings and thus reduce social support, which could have negative implications for psychosocial functioning. Lack of social connections might instead precede non-drinker status, so the results might reflect fewer opportunities for social drinking in this sample. Individuals living in the most deprived neighbourhoods (compared to the least deprived) and those with lower monthly income were more likely to be “non-drinkers” in the current study. Previous research has also found lower socioeconomic status to be associated with non-drinking (Beard et al, 2016; Puddephatt et al, 2021), and a recent cross-sectional study indicates that, regardless of severity, current drinkers have lower allostatic loads than non-

drinkers (Goldwater, Karlamangla, Merkin & Seeman, 2019). Hence, it may be that non-drinkers have poorer mental health due to stress related to disadvantage. Current results may also provide insight into the “alcohol harm paradox”, which concerns disproportionate levels of alcohol-related harm incurred by residents of more disadvantaged areas compared to those from more affluent areas – despite drinking at similar levels (Beard et al, 2016; Bellis et al, 2016). For example, almost half (48.70%) of “non-drinkers” lived in the most disadvantaged neighbourhoods compared to only 13.54% of “moderate drinkers”.

It is likely that the “non-drinker” class identified in this study is heterogeneous with regards to demographic profiles and drinking histories. “Non-drinkers” had the highest proportion of non-white and religious individuals, so abstinence from alcohol might be driven by cultural norms and faith-based principles (e.g. the belief that alcohol is forbidden in Islamic culture). Increased mental distress – and lower social capital – in this class might be explained by ethnic density effects (Bécares, Dewey & Das-Munshi, 2018; Shaw et al, 2012) or experiences of racial discrimination (Wallace, Nazroo & Bécares, 2016). However, there is an important distinction to be made between “non-drinkers” who are *former* drinkers versus *lifetime* abstainers. The latter may be more likely characterised by religious and/or non-white populations as a result of being raised in a culture that has a lower tolerance for alcohol use. On the other hand, many former drinkers have a history of alcohol use disorder or heavy consumption (Cranford, Krentzman, Mowbray & Robinson, 2014; John, Rumpf, Hanke & Meyer, 2021). Alcohol treatment services and support groups in the UK often advise individuals with alcohol problems (especially dependence) to focus on achieving and maintaining abstinence rather than reducing intake to safer levels. In the current study, heightened distress in “non-drinkers” might be explained by high comorbidity between alcohol problems and symptoms of mental disorder (Bell & Britton, 2014; Puddephatt et al, 2022), which may persist after alcohol cessation in former drinkers. Many people with psychological problems may also refrain from drinking in order to protect their mental health (Puddephatt, Makin, Gage, Jones & Goodwin, 2023).

As predicted, class membership predicted mental health at Wave 11. This is in line with a large body of previous research that suggests cyclical relationships between drinking and mental health (e.g. Bell & Britton, 2014). Longitudinal studies have found that changes in mental health precede changes in alcohol use more often than the reverse relationship (Bell & Britton, 2014). The current findings align with this since pre-baseline mental health was a significant covariate of class membership, whereas class membership helped to explain differences in mental health at follow-up.

5.4.1. Strengths and limitations

A large sample (N=22,880) was drawn from a nationally representative UK study and examined over a period of seven years. The longitudinal design allowed for investigation of changes in alcohol use over time, and the use of LCGA provided insight into differences in trajectories by potential drinker phenotypes. As a person-centred approach, LCGA is useful for investigating qualitative differences between underlying drinker subgroups, who may each operate under different sets of parameters. This offers a more detailed understanding of drinker types while still adopting rigorous, quantitative methods to achieve a parsimonious model that can be utilised in practice. Implementing a bias-adjusted 3-step approach (Vermunt & Magidson, 2021) when modelling predictors of class membership, as done in this study, is advantageous over simultaneous estimation of covariates (i.e., “one-step” approach) because it accounts for classification error (Vermunt, 2010). It is important to note that, although AUDIT-C was analysed as a continuous dependent variable, it is actually an ordinal variable. This approach assumes that differences between response categories are equal, although this might not be true in reality. Although UKHLS assesses alcohol use at almost every wave, the current study only utilised three waves of alcohol data. This is because AUDIT-C was only administered at these timepoints and was preferred over questions about past-month consumption due to its superior reliability and validity.

Examination of quadratic or cubic trends requires at least four timepoints, so it is unclear whether non-linear model would provide better model fit. Changes in alcohol use over time have been represented with linear trajectories (Patrick et al, 2022), but there is some evidence of non-linear (i.e., quadratic/cubic) drinking trends in other large, representative samples (Britton et al, 2015; Kraus et al, 2018), which could not have been captured in this study. Although the AUDIT-C provides insight into alcohol consumption over a 12-month period, there may be fluctuations in alcohol use that occur over shorter periods of time. Indeed, a latent transition analysis found that, over four measurements throughout a four-week period, drinkers from a general population sample exhibited unstable drinking patterns when alcohol use was measured via timeline follow-back (Staudt, Freyer-Adam, Meyer, John & Baumann, 2018). Short-term changes in consumption might be explained by differential patterns across the working week, seasonal effects, or festivities (e.g. Christmas) (Foster, Gmel, Estévez, Bähler & Mohler-Kuo, 2015; Heacock et al, 2022). These trends were not considered in the current study and may be relevant to (neighbourhood) social capital. For example, ethnic enclaves with norms and attitudes against drinking would be less susceptible to social

pressures of heavier drinking at Christmas, and higher-deprivation neighbourhoods characterised by low employment rates are likely to accommodate residents who have more unstructured time that is conducive to drinking patterns different from those observed in more affluent areas.

Although the AUDIT-C performs similarly to the full 10-item AUDIT for screening purposes (Bradley et al, 2007; de Meneses-Gaya et al, 2009), it is a limitation that data for the full AUDIT were not available in UKHLS. For latent class analysis and similar approaches, a greater number of indicators is preferable to improve classification accuracy and convergence rates, while reducing parameter bias (Wurpts & Geiser, 2014). In other words, the classes identified in the current study were based on only three indicators of alcohol consumption (i.e., the three AUDIT-C items), whereas the full AUDIT contains additional questions relating to alcohol-related consequences (e.g. alcohol-induced blackout, injuries to self or others due to drinking). These additional items would have been useful to help separate classes based on the alcohol *harms* they experience as well as consumption, since they provide some insight into the social contexts of drinking. It is possible that inclusion of this data could impact estimates of the relationship between class membership and neighbourhood social cohesion. For example, close-knit groups may either look out for one another and prevent excessive drinking; or might foster a “false sense of security” that promotes intoxication (Byrnes, Miller, Bourdeau & Johnson, 2019).

Social capital indicators had more than 10% missing data, which is the threshold above which missingness is thought to concur with statistical bias (Bennett, 2001). The IEMB sample of UKHLS were not administered any questions about neighbourhood social cohesion, which led to ethnocentric bias in this independent variable. Exclusion of this booster sample from conditional analyses also means that the findings may not be generalisable to the English general population. Residents of more disadvantaged neighbourhoods were also under-represented. These patterns in non-response are repeatedly found in health research (Bonevski et al, 2014). A previous report on UKHLS non-participation suggested that, in cases of non-response, participants from more socioeconomically deprived areas were harder to contact, whereas those from more affluent areas were more likely to refuse participation (Borkowska, 2019). There were also lower re-enumeration rates for some ethnic minority groups in the initial waves (i.e., 1 and 2) of UKHLS (Lynn, Burton, Kaminska, Knies & Nandi, 2012), which may have extended to the waves used in the current study. To account for the survey design, recruitment strategy and selection of waves for analysis, UKHLS provides tailored weights. However, it was not possible to derive a custom weight for the current study due to the combination of eligibility restrictions that limited the original sample, and so only

unweighted analyses were conducted. This means that the findings are not generalisable to the UK general population despite efforts to maintain representativeness (of England).

A further limitation of the analysis is that due to survey methodology, predictors and covariates were assessed at Wave 6 (“pre-baseline”), rather than at the same timepoint as baseline alcohol data. As a result of this temporal mismatch, there is some uncertainty regarding the explanatory value of the predictors and covariates. Firstly, it cannot be certain whether participants were drinking at similar levels during Wave 6 as they were at Wave 7, although the trajectories showed that all classes had relatively stable alcohol use. Secondly, any change between Waves 6 and 7 in sociodemographic factors (e.g. becoming unemployed) or mental health, which are known to be associated with drinking (Touvier et al, 2013), would not have been detected. Sensitivity analysis with mental health as a Wave 6 covariate (rather than Wave 7) showed that this had little impact on model parameters. Since this analysis was conducted in order to address the temporal gap between assessments of neighbourhood factors and mental health, this suggests that the model is stable because paired comparisons for (neighbourhood) social capital factors were completely unaffected. Finally, since length of residence was not controlled for, perceptions of neighbourhood cohesion may not relate to participants’ current address at baseline (i.e., Wave 7) in a small proportion of cases. Government statistics for 2021/22 show that, at the final wave of this analysis (i.e., Wave 11, 2019-2021), around one fifth (22%) of households in England had been residing at their current address for under three years (Department for Levelling Up, Housing & Communities, 2023), so it is likely that a similar proportion of the UKHLS sample had moved home during the analytic period.

It is important to note that neighbourhood social cohesion data were not aggregated to the neighbourhood-level. This is a limitation of the study because neighbourhood social cohesion is theorised to be a group-level asset (Putnam, 1995), yet it was operationalised as individual-level perceptions of cohesion. However, the multilevel design was taken into account since participants were nested within LSOAs. The decision against aggregation to the neighbourhood-level was primarily due to the small number of participants residing in each LSOA, which would likely have led to ecological fallacies (i.e., drawing inaccurate conclusions from biased estimates of area-level cohesion based on the same respondents who provide individual-level data) – particularly since the IEMBS were excluded from these questions.

5.4.2. Implications

Further longitudinal research is needed to examine whether the effects of NSC on alcohol use are causal. Cross-lagged analyses may help to determine whether changes in neighbourhood cohesion more strongly predict changes in alcohol use, or vice versa. It would be beneficial for nationally representative surveys to include some measure of NSC as the data mapping exercise (see Section 3.4.1.) conducted prior to analyses shows that this is rarely investigated in general population samples. Furthermore, there remains a need for a robust measure of ecological social capital (i.e., neighbourhood-level social capital) that does not rely on aggregation of individual perceptions of what constitutes a neighbourhood area. This need has long been recognised (De Silva et al, 2005; McKenzie, Whitley & Weich, 2002), and is important so that false conclusions about small area units are not made. For example, marginalised populations, or those in worse health, are under-represented in health research (Bonevski et al, 2014; Haapea et al, 2008; Shepherd, 2020; Smart & Harrison, 2017) so their neighbourhood perceptions may be overshadowed by more proactive members of their community, with whom there may also be tensions arising from “othering” (see Section 4.5.2. for an explanation of “othering”).

A similar analysis using UKHLS data in the future could capitalise on having sufficient datapoints to investigate whether polynomial relationships more accurately fit the data than linear relationships, especially since there will soon be more than three waves in which both AUDIT-C and neighbourhood cohesion questions are administered (separately). This type of analysis would also benefit from examining concurrent (or “dual”) trajectories of alcohol use as well as mental health as this might help to estimate the timeframe within which changes in one variable lead to changes in the other. Latent transition analysis could also be useful for investigating predictors of change between trajectory classes (referred to as “latent statuses” in this type of analysis), since preliminary investigations of drinking characteristics showed that some participants transitioned from being non-drinkers to drinkers, and vice versa. Future research should also focus on heterogeneity within non-drinkers, firstly because this population is growing (Caluzzi et al, 2022), and secondly because stressful life events can prompt transition from abstinence to problem drinking (Hoyland & Latendresse, 2018).

Recent reviews suggests that alcohol might be substituted for illicit drugs such as cannabis (Gunn, Aston & Metrik, 2022; Risso, Boniface, Subbaraman & Englund, 2020), particularly in the face of rising (alcoholic) beverage prices (Miller & Droste, 2013). This is particularly relevant in light of austerity measures since the fallout of the 2008 economic crisis and further

impacted by the cost-of-living crisis following the COVID-19 pandemic and Russia-Ukraine war (The Lancet Public Health, 2022). It cannot be confirmed whether (or to what extent) the current sample exhibit declining alcohol use in tandem with drug use changes, but future research should address this issue and examine what (neighbourhood) social factors might drive these behaviours. Without the available drug use data, the proportion of non-drinkers in this study that are also abstinent from other drugs cannot be confirmed. Latent class techniques could be helpful in differentiating populations with decreasing alcohol use with no substitution versus those who substitute alcohol for another substance.

5.5. Conclusion

This longitudinal study estimated a 6-class model of general alcohol consumption in a large English sample: “non-drinkers”, “very-low-level drinkers”, “low-level drinkers”, “moderate drinkers”, “borderliners”, and “high-risk drinkers”. All groups exhibited relatively stable drinking trajectories, with most classes also decreasing their alcohol consumption slightly by Wave 11. Class membership was associated with mental health assessed at baseline (i.e., Wave 7) and at Wave 11. Non-drinking was associated with greater psychological distress and lower (neighbourhood) social capital than other drinker groups. Future research should address whether linear or polynomial trends best fit alcohol use trajectories in general population samples. Although the current study employed a multilevel design to account for nesting within neighbourhoods, NSC was assessed at the individual-level only. Further research is needed to develop a robust measure of ecological social capital that can be used to differentiate contextual determinants of drinking from person-level influences.

CHAPTER 6: Using photo-elicitation interviews to explore barriers and facilitators of drinking reductions and abstinence in current and former drinkers residing in Merseyside, UK (Study 3)

This chapter describes the methods, findings and implications of a photo-elicitation interview (PEI) study that explores what features of neighbourhood environments are perceived as barriers and facilitators of drinking reductions/abstinence in current and former drinkers living in Merseyside, UK. This work builds on Study 2 by adding a deeper layer of understanding of *how* and *why* the relationships between neighbourhood factors and drinking trajectories were observed in quantitative analyses. This study explores lay narratives of individuals with lived experience of (contemplating) drinking reductions, which can also help to test the theorised mechanisms linking NSC and alcohol use proposed by the framework developed in Study 1.

6.1. Aim and objectives

The aim of the study was to explore how Merseyside residents endorsing a desire to reduce their alcohol use perceive their neighbourhood environments to influence drinking behaviours. The study had three objectives:

- a) To examine, through the lens of social capital, neighbourhood barriers and facilitators of reduced alcohol consumption (or abstinence) in current and former drinkers
- b) To investigate perceptions of how changes to the neighbourhood affected their drinking practices
- c) To investigate perceptions of how improvements to the neighbourhood built and social environments could be used to mitigate alcohol harms

6.2. Methods

6.2.1. Overview of methods

The study used photo-elicitation interviews (PEI; Harper, 2002) to explore how Merseyside residents perceive their neighbourhood environments to influence their efforts to cut down on (or abstain from) alcohol. The PEI method used in this study took a participatory approach to examining community issues and involved the use of photographs to facilitate discussion. In existing research, the extent of participant involvement varies across PEI studies. Bates and colleagues (2017) specify that, in some cases, a pre-determined selection of photographs is provided to participants (i.e., “researcher-driven”), whereas other approaches afford participants with a greater degree of control over the photographed content (i.e., “participant-driven”). In these cases, participants may be able to freely photograph anything that they perceive as relating to the topic of interest (i.e., “open” PEI) or take their own photographs that address specific research questions (i.e., “semi-structured PEI”). The current study took a semi-structured approach to PEI (Bates et al, 2017) that involved participants photographing features of their neighbourhoods that helped and hindered efforts to reduce their alcohol consumption or maintain abstinence. The project involved an initial workshop describing the aims and process of the study, a photography task, and an interview facilitated by the photographs to discuss their experiences. The photos generated by participants during this process were useful tools for mapping both the physical capital of the built neighbourhood environment and NSC. Interviews about the photographs explored the overlap between these different types of capital. In this context, an advantage of PEI over a standard interview process was that participants were not constrained by the researcher’s expectations of what aspects of the neighbourhood impact drinking behaviours. This enabled participants to focus on community issues that they deemed a priority. This was important because there is often a mismatch between perceived and objectively-determined barriers and facilitators of health-related behaviours (Roda et al, 2016).

6.2.2. Research setting

The study was conducted in the Merseyside boroughs of Liverpool, Sefton, and Wirral, which are located in the North West of England, UK. Liverpool has high levels of alcohol-related mortality, morbidity, and hospitalisation compared to other regions of the country (Office for Health Improvement & Disparities, 2024; Public Health England, 2020). The city has

undergone extensive urban regeneration over the last few decades (Fageir, Porter & Borsi, 2020) but continues to rank in the top ten most deprived local authorities according to the latest update to the English Indices of Deprivation (IMD; Ministry of Housing, Communities & Local Government, 2019). As of 2019, the most recent available data suggests that, out of 317 local authority areas, Liverpool was the third most deprived, while Sefton and Wirral ranked as the 58th and 42nd most deprived respectively (Liverpool City Council, 2019). However, in each of the three local authorities, there is variation between wards with regards to deprivation levels (Brewer, 2020; Liverpool City Council, 2020; Wirral Intelligence Service, 2019).

6.2.3. Recruitment and sample

In total, 48 venues (i.e., recovery groups and community centres) were approached in person, by email, and/or by telephone. Although staff at these sites did not act as gatekeepers, they were contacted prior to recruitment efforts to get permission to conduct work there and arrange suitable times for the researcher to attend. The eligibility criteria are provided in Table 18. Further details regarding the sample are provided in Table 19. Each participant received a total of £50 in vouchers for their involvement. Participants received a £10 voucher for attending the initial workshop and the remaining £40 in vouchers for attending the interview. This approach was adopted to incentivise participation and minimise attrition.

Table 18 – *Eligibility criteria and justifications*

Inclusion criteria	Justification
Aged 30-64	Including individuals aged 30+ years ensured participants were able to reflect on how Liverpool has changed over the past decade of their adulthood, when they were of legal drinking age, including the stage at which youth often “mature out” of risky drinking. Individuals aged 64+ were excluded due to the impact of aging on employment and increased occurrence of health-related (including mobility) issues associated with older age. These factors are likely to affect interactions within the neighbourhood and perceived importance of neighbourhood social environments.
Current drinker and has recently considered reducing intake OR former drinker and is currently abstinent	Current drinkers must have considered reducing their alcohol consumption, as a key objective the study was to identify barriers and facilitators of reductions in drinking. It was therefore important that the sample had lived experience of contemplating change in their drinking behaviours. The definition of “current drinker” in this study was based on the lower threshold for “current moderate drinker”, as defined by the Centers for Disease Control and Prevention (CDC, 2018), i.e. drinking on average more than 3 drinks per week.

Former drinkers must not have been currently engaged with detoxification services or structured alcohol treatment services – although those engaged with community-based alcohol support services were eligible.

Currently resides in Liverpool/Wirral and has lived here for >5 years	To ensure that participants were familiar with the neighbourhood and/or city and had lived in the area long enough to experience changes in their local environment.
Fluent English-speaker	To ensure participants had adequate ability to consent to, understand, and partake in the research interviews.

6.2.4. Self-report measures

Participants completed a short online questionnaire via Jisc online surveys to obtain socio-demographic data (age, gender, educational level, ethnicity, broad occupational grade, income bracket, religion, relationship status), length of residence at their current address, and whether they had ever received treatment for alcohol problems. Further self-report measures comprising the online form examined their past-year alcohol use, using the AUDIT (Saunders et al, 1993); current mental health, using the GHQ-12 (Goldberg & Williams, 1988); and perceived neighbourhood social environments, using Buckner's Neighbourhood Cohesion Instrument (Buckner, 1988) and the social cohesion scale used in the Project on Human Development in Chicago Neighborhoods (Sampson et al, 1997). The assessment tools used to evaluate these factors were the same as those used in the UK Household Longitudinal Study (Section 5.2.2.).

6.2.5. Initial workshop and photography task

6.2.5.1. Workshop overview: rationale, logistics, and content

The initial workshop lasted approximately 60-90 minutes and was held at participants' local community centre or recovery group from which they were recruited. Participants received reminders via email, text message and/or WhatsApp concerning their attendance at the study sessions. Workshops and interviews were not held in university buildings as this was not considered a neutral space. This was important because participatory research involves efforts to equalise the power relations between the researcher and collaborators (i.e., participants). The use of university facilities was likely to reaffirm the authoritative position of

academics, which could have also impeded participants willingness to share their views and experiences. This workshop involved rapport-building, a project overview supplemented with a short PowerPoint presentation (see Appendix 10), visual literacy activities (see Section 6.2.5.2.), and mind mapping general views and concerns about the local environment in relation to alcohol use. The session was not audio-recorded as the main objective was not to begin data collection, but to develop a strong relationship with the individuals and ensure the photography task was understood. However, the author took brief notes regarding group (social) dynamics. The session was facilitated using a conversational style, which extended throughout the entirety of the fieldwork. A total of 16 workshops were conducted with 27 participants, but seven of these individuals did not return for the interview and hence were not included in the study. This included five individuals who stopped responding to the researcher's correspondence following the workshop and two individuals who dropped out due to personal reasons. Three workshops were conducted with groups of between two and seven participants while the other workshops were conducted on a one-to-one basis due to difficulties with scheduling, preference for anonymity, and low interest in the study. Three mind maps addressing the three prompts for the photography task were generated at each workshop, so a total of 48 mind maps were produced.

6.2.5.2. Visual literacy activities

A selection of copyright-free images obtained from online sources were used to generate conversations about photographic techniques and different interpretations of meaning in photographs. The images were not aligned with any specific theme and were presented in order from least to most ambiguous (as perceived by the researcher) to gradually increase the complexity of photographic discourse. Due to the limited photography-related knowledge and skills of the researcher, this aspect of the session did not involve "teaching" photography skills. Instead, the goal of this exercise was to stimulate critical and creative thinking, while building rapport within the group. This is important because the interviews and photography process required some analytical skill to interpret and create photographic content, as well as a "safe space" to share ideas and concerns. A short list of photography concepts (e.g. lighting, colour; see Appendix 10 for visual literacy materials presented in the workshop) was used to prompt consideration of how basic techniques can be used to convey emotions and ideas. The author emphasised that the photography tasks did not call for participants to take the "best" photographs, and that the focus of the tasks was less on aesthetics and more on capturing a visual representation of their experiences or opinions.

6.2.5.3. *Informal workshop discussions and photography task*

The informal discussion centred around the research objectives, which were rephrased in lay terms and used as a task guide. There was minimal input from the researcher during the general discussion to prevent introducing bias regarding what were important neighbourhood issues for participants. The main role of the researcher in this part of the session was to prompt participants to engage in the conversation using questions based on the research objectives, and to consolidate participants' ideas in the form of a mind map. At this stage, written informed consent was obtained. Further details regarding ethics and consent are provided in Appendix 5 and Appendix 9. All participants were provided with digital copies of the mind maps, along with electronic and/or physical copies of the participant information sheet (Appendix 7 and Appendix 8) and consent forms. Prompts for the photography task were printed on 3.5x2" business cards (Figure 7) designed by the researcher using *Canva*, an online graphic design platform, and distributed at the end of the workshop. Bullet-pointed guidance on how to ensure ethical photography was printed on the back of the cards, with the researcher's contact details also available on the cards.

The photography task was guided by one overarching prompt (*"Alcohol and my neighbourhood"*) and three specific prompts:

- *"What features of my neighbourhood make cutting down on alcohol easier?"*
- *"What features of my neighbourhood make cutting down on alcohol harder?"*
- *"How has Liverpool changed over the past 10 years? How have the changes affected people's alcohol use?"*

Participants were informed that they had approximately 1-2 weeks to complete the photography task. They could take as many photographs as they liked but it was made clear that only their top two to three most important photographs (as chosen by them) would be discussed for each prompt at the interview. Participants were requested to send the photographs to the researcher via email, WhatsApp, or other cloud-based services upon completion of the task. No digital cameras, which were available upon request, were required by participants, who all chose to use their mobile phones to take photographs.

Figure 7 - Front (left) and back (right) of the cards displaying the three prompts for the photography task



6.2.6. Individual semi-structured interviews

Individual semi-structured interviews were held at the same sites from which participants were recruited, with the exception of two participants who were interviewed in quiet cafés. For one participant, this was because the venue she was recruited from was undergoing refurbishment at the time of the interview, and for the other participant, this was based on her preference to be interviewed somewhere she would not be seen to be affiliated with the study. Each interview lasted approximately 45 minutes to an hour. This session was conducted on a one-to-one basis for several reasons. Firstly, this interview explored neighbourhood determinants of participants' own alcohol use in greater depth, which was not deemed appropriate for a group setting – particularly one in which participants all attended the same community centre/recovery group. Secondly, with regards to the social environment, some participants discussed how peer drinking behaviours influenced their own alcohol use or mentioned social relationships as sources of stress. Thus, one-to-one interviews as opposed to group interviews enabled participants to speak openly about these issues and were less likely to elicit negative social repercussions. Thirdly, it was likely that focus groups would have included some participants who were more willing to share their narratives and opinions than others, while some people may have been less inclined to speak publicly about their personal experiences. Indeed, this was the case at group workshops. Individual interviews provided an opportunity for those participants who contributed less to the workshop discussions to have their views represented.

The top two to three photographs for each prompt, as chosen by participants, were professionally developed and physical prints were displayed during the interview. With regards

to the interview content, the discussion began by asking participants *“how did you find the photography task?”* and what was their main reason for wanting to reduce their alcohol consumption. The structured aspect of the interview was based on the SHOWeD technique (Wang, Yi, Tao & Carovano, 1998), which is an acronym for the following set of questions: What do you **S**ee here? What is really **H**appening here? How does this relate to **O**ur lives? **W**hy does this problem, concern or strength **E**xist? What can we **D**o about it? The current study involved asking participants questions such as:

- *“What is this photo of?”*
- *“What prompt does this photo represent?”*
- *“Why is this photo important to you?” or “What does this photo represent?”*
- *“How does this relate to your alcohol use?”*
- *“What needs to be done to tackle this issue?” or “How can we ensure [feature] remains accessible/well-maintained?”*

Further questions related to the perceived social environments of the photographed places, how participants felt when they visited these locations, and probed for more detailed information about how the neighbourhood features influenced drinking behaviours (e.g. how their typical level of intoxication in one place differed compared to when they visit another of the photographed places) and/or attitudes towards drinking. The interviews were audio recorded using the researcher’s iPhone, with a voice recorder for back up. All interviews were transcribed within three days of the interview, which minimised the risk of bias arising from any data loss due to poor recording quality, which affected one interview. Notes taken in the interview and recent memory of the discussion helped to contextualise the uncorrupted data. Participants were given the printed photographs to keep after the interview.

6.2.7. Ethics

This study was approved by Liverpool John Moores University Research Ethics Committee in September 2022. Due to difficulties with recruitment (see reflexive notes in Appendix 11), the study aims and protocol were updated to enable recruitment from alcohol recovery support groups. Approval of this study amendment was granted in May 2023. The original ethics application, ethics amendment form, and all participant-facing materials are provided in Appendices 5-10.

There were several ethical considerations that were made explicitly clear to participants during image ethics training at the workshop. Firstly, participants should not themselves or others at risk to take a photograph. They were also asked to avoid taking photographs that showed illegal activity or other people, in particular their faces. They were permitted to take photos that include non-identifiable features of individuals, such as hands or silhouettes, but were informed that this came with higher risks of the person being identifiable and so their photographs might need to be edited by the researcher to ensure anonymity. The researcher reminded participants that this risk would increase further if features such as tattoos, custom clothing, workplace uniform/logo, or birthmarks/scars are visible. Participants were not permitted to take photographs of children at all. However, some participants did select photographs of people, including children who were relatives. These photographs were used for the interview but were either edited to obscure any identifiable features or omitted from the thesis.

Participants were assigned identification codes to ensure confidentiality, and an encrypted spreadsheet linking participants to their respective codes was stored separately to their data. Regarding data management, participant data (questionnaire responses, audio recordings and transcripts) was stored securely in password-protected files on a personal Liverpool John Moores University OneDrive. Once the audio recordings had been transcribed, they were immediately destroyed. It was made clear that the spreadsheet linking participants to their identification codes would be retained for three months after the focus group so that participants had adequate time to withdraw from the study. In the case of participant withdrawal, their data could be located using the spreadsheet and destroyed. Once the spreadsheet had been destroyed, participants could no longer withdraw from the study, however all retained data was anonymised at this point so that personal identification (even by the researcher managing the data) was not possible. No participants contacted the researcher to withdraw their data from the study.

6.2.8. Analytic approach

Interview transcripts were analysed using thematic analysis (Braun and Clarke, 2006). Previous PEI work focusing on environmental determinants of health has also taken this analytical approach (Bornioli, Parkhurst & Morgan, 2018). The steps involved in thematic analysis are described in Study 1 (Section 4.3.) and further details regarding the rationale for this approach and positioning of the researcher are provided in Chapter 3 and Section 1.6. respectively.

Reflexive thematic analysis was carried out using inductive coding to adhere to the core principles of participatory research. Since this type of study is “participant-led” and requires thorough consideration of power dynamics, a bottom-up approach (i.e. inductive) to analysis is more apt for generating themes that better reflect participants’ priorities and lessens the potential biases stemming from deductive reasoning. For example, deductive coding may be useful for aligning participant narratives with existing theory; however, organising themes in accordance with theorised patterns rather than emerging insights from the data might lead to misrepresentation of participants’ realities and views. Chapter 7 outlines the triangulation process used to consolidate the findings from each of the studies in this thesis and provides greater detail regarding theory-driven interpretations of the current study’s findings.

6.3. Results

A total of 20 participants living in 14 urban neighbourhoods were recruited from six venues. The six venues included three recovery groups, two community centres and one university. All participants collaborated with the researchers on this project by contributing both original images and interview data. Eleven participants were current drinkers and only one of these individuals was recruited from a recovery group. The remaining nine participants were former drinkers, of which seven were recruited from recovery groups.

Two participants chose photographs of their children to discuss at their interviews. The photographs were included in the discussions but have been omitted from this thesis due to ethical concerns. Two participants, who both had mobility issues, chose to discuss some images taken from the internet (e.g. Google Images, Google Maps). Again, these images were included in discussions as they represented neighbourhood issues important to the participants, but they have not been reproduced in the thesis due to copyright. Table 19 summarises the sample characteristics.

Five main themes, encompassing a total of nine sub-themes, were identified from participants’ narratives regarding neighbourhood barriers and facilitators of drinking reductions. The five overarching themes included: (i) alcohol accessibility; (ii) dissatisfaction and stress related to the living environment; (iii) accessibility and quality of amenities and services; (iv) neighbourhood social cohesion; and (v) neighbourhood socio-economic/demographic composition and neighbourhood identity. Figure 8 illustrates the main themes and sub-themes.

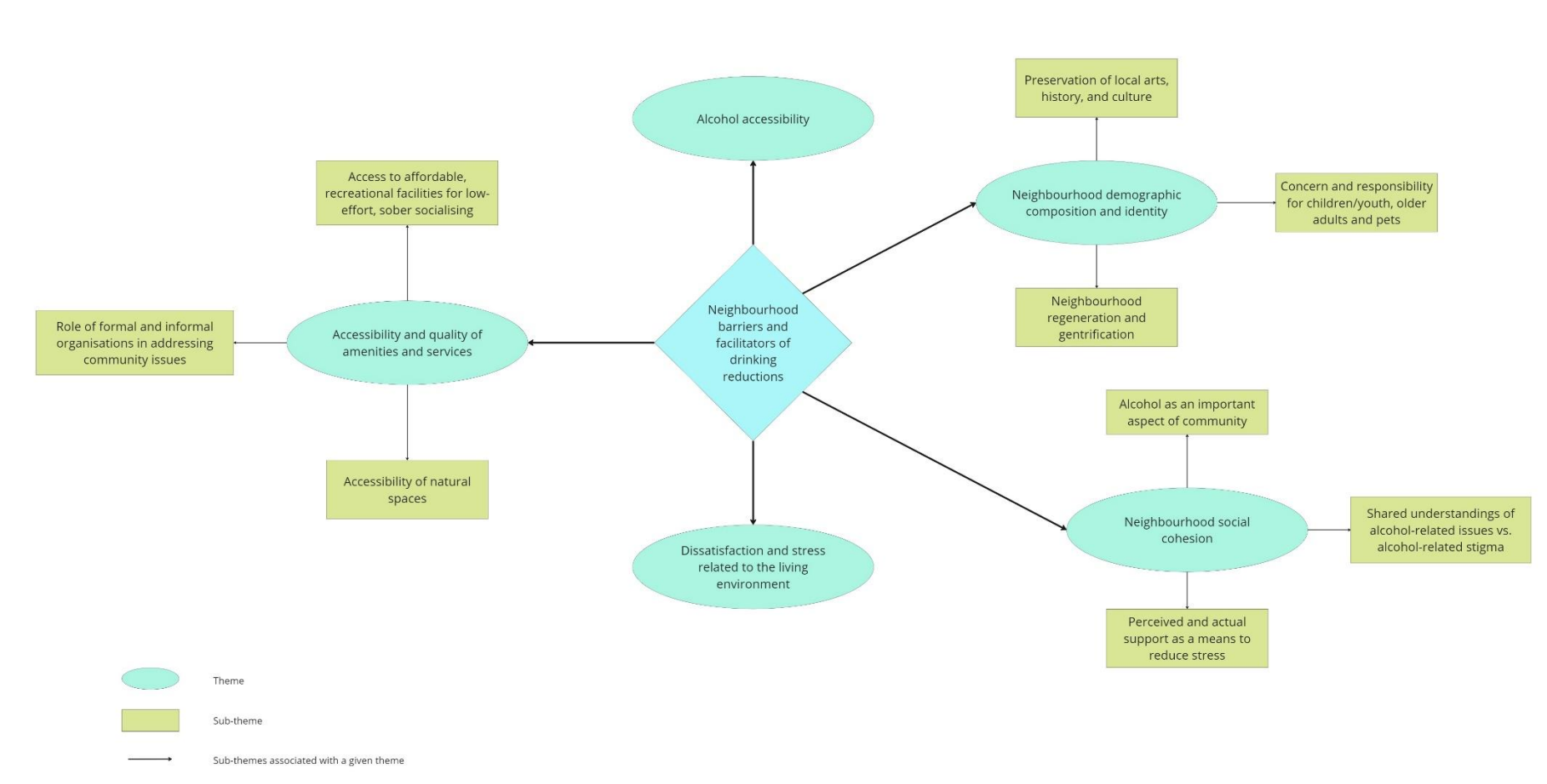
Table 19 - Sociodemographic and neighbourhood characteristics, mental health and alcohol use for the overall sample

		Current drinkers (n = 11)	Former drinkers (n = 9)	Total (N = 20)
		<i>M (SD) / n (%)</i>	<i>M (SD) / n (%)</i>	<i>M (SD) / n (%)</i>
Gender				
	Male	4 (36.4)	6 (66.7)	10 (50)
	Female	7 (63.6)	3 (33.3)	10 (50)
Age		46.64 (8.41)	53.56 (4.37)	49.75 (7.71)
Length of residence at current address				
	Less than a year	0 (0)	2 (22.2)	2 (10)
	1-2 years	2 (18.2)	0 (0)	2 (10)
	3-5 years	1 (9.1)	0 (0)	1 (5)
	5-10 years	2 (18.2)	1 (11.1)	3 (15)
	10+ years	6 (54.5)	6 (55.7)	12 (60)
AUDIT score		13.9 (4.32)	13.22 (13.19)	13.6 (9.41)
Neighbourhood cohesion score		15 (2.17)	11 (2.87)	13.2 (3.20)
Organisational membership				
	Yes	8 (72.7)	6 (66.7)	14 (70)
	No	3 (27.3)	3 (33.3)	6 (30)
Volunteered				
	Yes	4 (36.4)	4 (44.4)	8 (40)
	No	7 (63.6)	5 (55.6)	12 (60)

Table 20 - Table of individual participant characteristics

Participant number	Current/former drinker	Gender
1	Former	M
2	Current	F
3	Current	M
4	Former	F
5	Former	M
6	Current	F
7	Former	M
8	Current	M
9	Current	F
10	Current	F
11	Former	M
12	Former	F
13	Current	F
14	Current	M
15	Former	F
16	Former	M
17	Current	F
18	Former	M
19	Current	M
20	Current	F

Figure 8 - Thematic map illustrating themes and sub-themes



6.3.1. Theme 1: Alcohol availability and accessibility

Most participants referred to high availability and accessibility of alcohol in their neighbourhoods, which were barriers to drinking reductions and maintaining abstinence. Marketing efforts, such as offers and multi-buy promotions, further enhanced the ease of access to alcohol. However, lower-strength and alcohol-free options were perceived to be much less accessible. Many participants observed a high density of on- and off-license premises in their neighbourhoods such as pubs, bars, and off-licenses. These were often among the closest amenities to their home (see Figure 9):

“...it’s like a three-minute walk from my house so it’s close. It’s the closest shop of any sort to me.” (Participant 10)

“...you can’t really escape from it. See, this is my front door [Figure 9], and then you got a pub there, and you got an off-license there. Another 200 metres down the road there, there’s another pub. Another quarter mile that way, there’s another pub. So, in England, there’s a pub or an off-license on every corner, so it – even if you’re trying to stay away, it’s impossible to stay away.” (Participant 19)



Figure 9 - Photograph from front door depicting proximity to an off-license and pub (Theme 1)

Several participants mentioned that supermarkets and off-licenses near to their homes were open 24/7:

“...we knew that that was still open late, it’s convenient to go and buy more...” (Participant 12)

Other participants described alcogenic features of their neighbourhoods as being pervasive because they were constantly exposed to visual, auditory and olfactory alcohol-related cues:

“...like a habitual party town where – and I’m not even saying night-time venues, daytime venues are there, you know, and constantly available...” (Participant 3)

“...just with it being on the doorstep really... I think when you’re sort of in recovery, just going past somewhere like that, you know, cus the smell sort of wafts out doesn’t it...” (Participant 12)

Moreover, drinking venues and off-licenses often clustered among other establishments selling health-harming goods or were perceived as exploitative, such as pawn shops, betting shops and fast-food outlets. This has implications for neighbourhood identity (see Section 6.3.5. Theme 5).

Most participants photographed and/or mentioned the permeation of alcohol advertising in the neighbourhood built environment as a barrier to drinking reductions (see Figure 10 and Figure 11). Advertisements typically included multi-buy promotions, pricing discounts, and happy hours, and were often displayed in windows so it was not necessary to enter the premise to be exposed to alcohol marketing. This made the availability of alcohol (i.e. sub-theme 1.1.) a more salient aspect of the neighbourhood environment. These offers increased temptation to drink and led to buying higher quantities of alcohol, as explained by several participants:

“They have a happy hour [Figure 10]. Why not just have a drink – it’s cheap.” (Participant 1)



Figure 10 - Photograph of advertisement for
"cheap" on-trade alcoholic beverages
(Theme 1)

"...because if you're gonna buy a 70cl and then they've got an offer on like a litre and it's only gonna be like a couple of pound more, it's absolute common sense isn't it [laughs], you've gotta go for the litre." (Participant 12; Figure 1)



Figure 11 - Photograph of a nearby off-licence that has cheap deals on alcohol (Theme 1)

One participant noted a shift away from direct alcohol advertising in supermarkets but was wary that this seemingly positive change may be superficial as alcohol was promoted through marketing of other types of goods:

“...normally on windows they have a lot of kind of like alcohol offers. So, I think one that I remember is like, you get a pizza, something and a certain amount of beers for like a fiver. It seems so cheap. And I think that definitely probably makes cutting down on alcohol harder...obviously they’ve got these healthy pictures of like leaves and fruits but that’s kind of what I would think is out of ordinary for the store...” (Participant 14)

Several narratives also related to the “gamification” and glamourisation of alcohol use and/or purchases. For example, some described winning alcohol as prizes via raffles at supermarkets and at school events. These strategies were perceived to make alcohol seem more attractive and hence constitute a barrier to drinking reductions/abstinence, as described by one participant who noted:

“...the way alcohol’s dressed up all Christmas-y and it’s like, apparently that’s got like, it’s like a snowglobe but it’s gin... they’re dressing up something that’s potentially a killer, is basically what they’ve done...” (Participant 4; Figure 12)



Figure 12 - Photograph of alcohol "dressed up all Christmas-y" as a raffle prize in a supermarket (Theme 1)

Some participants attributed a shift towards home drinking to the cost-of-living crisis – suggesting that, in off-license premises, *“you can buy four cans for the same price you could buy about one pint of beer”* (Participant 19). In on-license premises, the price of standard alcoholic drinks were comparable to those of soft drinks – or even cheaper:

“You’ll find sometimes that there’s a pint of coke that’ll cost more than a pint of lager, so if you’re looking at it and you’re on a budget, you just think well I might as well have a pint of lager...” (Participant 9)

Discussions regarding development in accessing alcohol through home delivery were pertinent. For example, one participant explained that *“being able to have alcohol delivered to the house was like a death sentence”* (Participant 12) for her mother, while others mentioned the use of e-scooters, which *“if you’re up at 4 o’clock in the morning and you don’t have the money for a taxi or you have your last fiver for a bottle of wine or whatever, you can just jump on one of those and it’s there...”* (Participant 10; Figure 13).



Figure 13 - Photograph of an e-scooter that is publicly available in the neighbourhood and facilitates access to alcohol (Theme 1)

Several former and current drinkers were receptive to low-alcohol and alcohol-free beverages as a means to enjoy social drinking situations without consuming (as much) alcohol. However, these products were neither as visible nor as frequently promoted via deals in shops compared to full-strength alcoholic options. Narratives regarding the accessibility of no- and low-alcohol options often emerged during discussions about what could be done to address neighbourhood problems, rather than being mentioned as specific barriers or facilitators of drinking reductions.

Two former drinkers who did consume non-alcoholic products explained that:

“What I’m doing now, I do buy the 25 off but I buy the sparkling alcohol-free. I do like the sparkling alcohol-free, but they are too expensive...” (Participant 1)

“...if they did it with the alcohol-free ones then yeah, I might be tempted but if it’s just the normal ones then nah, doesn’t appeal to me...” (Participant 16)

Participants who mentioned the accessibility of low-strength and alcohol-free beverages consistently advocated for greater promotion of these products:

“...some places could frontload more that they have non-alcohol options and you know, cus a lot of places, you go in and you say “do you have non-alcoholic options?” whereas I think it should be frontloaded just as much as the alcohol options...” (Participant 10).

6.3.2. Theme 2: Dissatisfaction and stress related to the living environment

Most participants discussed some dissatisfaction with their neighbourhood environment, and this was primarily related to facets of neighbourhood disorder (see Section 1.2.3. for a conceptual overview) such as antisocial behaviour, deterioration of green spaces, abandoned places, problems with neighbours and youth, and a lack of variety in amenities (see Theme 3 in Section 6.3.3. for further detail regarding the link between this theme and neighbourhood amenities). These neighbourhood features were typically described as barriers to drinking reductions and abstinence, but in some cases were found to deter drinking – especially in on-trade venues.

When described as a barrier to drinking reductions, participants suggested that feelings of hopelessness and stress associated with the presence of these features made decreasing their alcohol consumption more difficult. As such, several participants expressed drinking to cope with their surroundings:

“They can make you feel that way where you go, oh God, doom and gloom, I’ll have a drink, so to speak.” (Participant 8)

“...basically, they’re not looking after the property, they’re not caring about where they live, they’re not caring about their environment so that does depress me so I would drink because of that.” (Participant 13)

Further insight from another participant emphasised that it was chronic exposure to such physical environments and a lack of diversity in amenities that was a drinking motive, rather than her drinking being driven by a conscious choice to alleviate acute stress associated with the neighbourhood (see Figure 14 and Figure 15). She stated:

“Although I wouldn’t like walk round and go, you know, “another shop gone, I’ve gotta go and have a drink” [laughs], in the background, these things just have a knock-on effect, so it does trickle into your psyche and being like, hopelessness, which sounds extreme but you’re

hopeless because you can't do anything to change that situation, cus it's out of your hands... I wouldn't immediately associate it to this but it is just that imprint, isn't it?" (Participant 20)



Figure 14 - Photograph depicting a lack of variety in neighbourhood amenities (Theme 2)



Figure 15 - Photograph of boarded up shops that create a depressing environment (Theme 2)

The impact of chronic stress was reflected in several other participant accounts, such as one individual who *"had a lot of trouble in the street lately and it was like, ugh, every time something happened you'd be like, a glass of wine – it's getting a bit much now, every time the police come [laughs]. The police were in our street every other day at one point..."* (Participant 9; Figure 16).

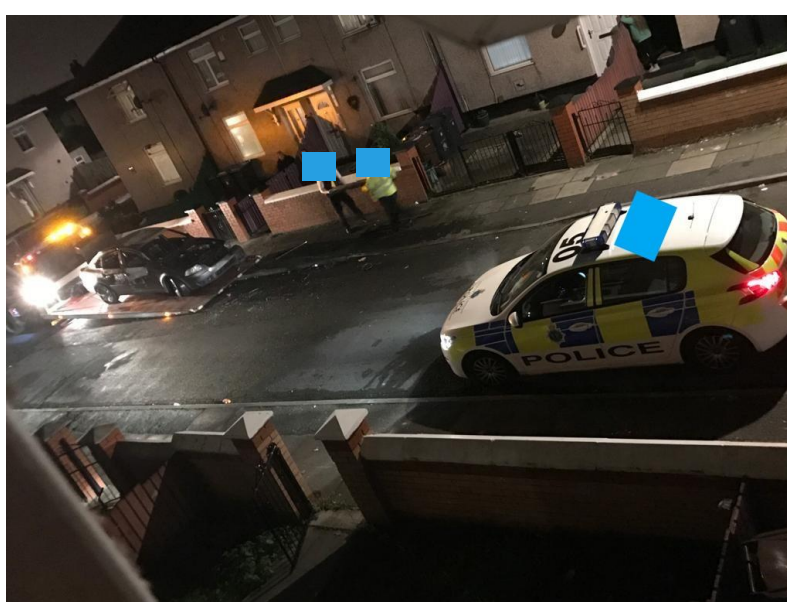


Figure 16 - Photograph of police in the street due to "neighbour disputes and things" (Theme 2)

Furthermore, this theme drew attention to additional barriers to reducing drinking in those participants who reported that the interaction between neighbourhood socio-demographic/economic and health characteristics intersected, and this amplified experiences of neighbourhood stressors. A salient aspect of women's narratives was that neighbourhood disorder could be particularly stressful for those who had childcare responsibilities and were burdened with a duty to shield their children from antisocial behaviour and other indicators of neighbourhood disorder. For example, one participant felt frustrated due to a high level of visible drug use and drug-dealing on her street, which she wanted to prevent her grandchildren from being exposed to. However, she also mentioned problems with youth in the area – which she attributed to poor parenting – and these children would kick footballs at her house, hit her wall with a hammer, and scream in the street:

“...I haven't actually gone over the road and said, “look, you need to stop it” because if I went over the road and said that, [the mother]’d start back at me and then I’d basically – I could lose it and I don’t want that, so I don’t. And I sit there and I carry on drinking.”

(Participant 13)

Also regarding intersectionality, another participant who has mobility issues focused on how deterioration of the built environment (e.g. potholes) was a major source of stress, saying:

“...this is our alleyway that I go through to get to any of the shops or the doctors or anything that’s our way, cut through. Erm, and as you can see, all the pavement’s gone. There’s big holes... I did nearly go over my walking frame because the potholes are that bad... This pave here is in about 4 pieces and it’s all sunken. It’s all sunken here as well. I’ve gotta go up – and it’s on a corner by the way...” (Participant 17; Figure 17)



Figure 17 - *Photograph of a mobility scooter, which is difficult to use on broken pavements in the local area (Theme 2)*

Signs of disorder that prompted dissatisfaction and stress were also discussed as facilitating reductions in drinking. Undesirable neighbourhood environments, including crime, gang activity and antisocial behaviour, deterred drinking in on-trade establishments. For some participants, this meant that they would drink less often in these venues or would not drink at all, whereas others would instead drink in the home. In the latter case, neighbourhood disorder may not be best understood as a ‘facilitator’ of drinking reductions, but as a factor that influenced drinking locations:

“Well, I think sometimes you’d rather sit in the house and have a drink than go to the pub...some of them have got a gang association. Erm, and obviously the drug dealers and stuff like that are associated with certain pubs...” (Participant 6)

“The High Street’s never been the same since this [points to photo], the pub where somebody got shot – gang-related. But that used to – it doesn’t look it now – but that used to be the bees knees to go... People’re scared to go out drinking, obviously, you know...”
(Participant 8; Figure 18)



Figure 18 - Photograph of a pub that used to be "the bee's knees" prior to gang-related violence that occurred here (Theme 2)

"...when I go out I drink far less or sometimes not at all. Err and because I see antisocial behaviour, because I'm not safely in my home, because alcohol does, you know, affect you obviously, it's not that I distrust myself when I drink, it's that I distrust being around others when they drink." (Participant 3)

6.3.3. Theme 3: Accessibility and quality of amenities and services

Participants cited a range of amenities that they thought helped efforts to reduce their alcohol intake, such as community centres, coffee shops, sports facilities, health and wellbeing support services, formal organisations, and natural spaces. Conversely, a lack of amenities, and in their diversity, and poorly maintained spaces were explicitly described as barriers to drinking reductions. This highlighted an overlap with the neighbourhood social cohesion theme (Section 6.3.4. Theme 4) as positive neighbourhood perceptions encouraged residents to interact within, and take care of, their local facilities and natural spaces.

Sub-theme 3.1: Access to affordable, recreational facilities for low-effort, sober socialising

Many participants cited venues such as community centres, coffee shops, theatres, and sports and exercise facilities as facilitators of drinking reductions because they provided opportunities for sober socialising, learning new skills, and a distraction from stressors in the home. As

stated by multiple participants, these places encouraged them to simply “*get out the house*” and visit sites in which there was a sense of community, which in turn enabled access to informal social support. This included emotional, informational, and tangible support (see Section 6.3.4. Theme 4 for a summary of how social support was perceived to influence efforts to reduce alcohol consumption). One participant said about her community centre:

“...it changes everything about the neighbourhood as well. Because it gives you more of a sense of community, like I’ve made friends here that I wouldn’t usually make, and they actually live on my street and the street opposite me as well. It’s boss... And then obviously, with the not drinking as well, it’s made life a heck of a lot easier. I mean, it’s not perfect, but thanks to this place, I’ve actually been able to get a lot of help. And also, they do erm, it’s called a “warm bank”, like during the winter months. Erm, every Thursday, they put like a whole bunch of food out and sometimes like we have games and stuff.” (Participant 2)

In relation to the same community centre mentioned above, other participants recruited from this site added:

“Well, yeah, cus I have done the slow cookery course – I’ve done err, level 2 health and safety. I passed that 100% the other week!... It’s a feel-good place, this place.” (Participant 13)

“...when we were doing the yoga, I’d never thought about doing – I’d always wanted to do it, but I would never’ve gone to a class because I’m a big woman...it was just all us and everybody in the community and you know, there was quite a few of us who done it and it was really good and it helped me a lot, physically and mentally.” (Participant 17)

These quotes reinforce the potential benefits for self-efficacy and self-esteem, derived from engagement in community-based activities, which may protect against problematic alcohol consumption. Similarly, participants attending recovery groups shared these benefits, which were linked to participation in photography groups and other informal courses. For example:

“...it’ll introduce you to new experiences that you can enjoy without drink, and meet people who enjoy different experiences without drink. Give you the tools to carry on. So that’s what [recovery group] does.” (Participant 18)

Furthermore, the emphasis on *low-effort* socialising is apparent in one participant’s narrative relating to coffee shops as facilitators of drinking reductions (see Figure 19):

“But it’s more a coffee shop than a restaurant. Because a restaurant you’re gonna be like ah there’s a main course, and that is not – you can just have a sandwich, something light. It’s nice and you get out the house. I think that’s why people go for a pub – just to get out the house.” (Participant 1)



Figure 19 - Photograph of a coffee shop, which facilitates low-effort socialising without alcohol (Theme 3)

In line with these narratives, participants who lived in neighbourhoods perceived to be lacking in recreational amenities found this to be a barrier to drinking reductions. Alcohol was often consumed to ameliorate boredom in current drinkers, while former drinkers found that having little to do in their neighbourhood left them feeling frustrated and isolated:

“...this is what I thought for what features make cutting down on alcohol harder. Erm, just in terms of, there’s not that much to do...but in terms of things to do, and if you’re at home and you’re kinda a bit bored, alcohol seems like a good go-to, something to kind of entertain yourself with.” (Participant 14)

“I was trying to find some activities that showed there were things that you could do other than go to the pub or drink and I really actually struggled, you know?” (Participant 10)

Some neighbourhood assets were mentioned only by former drinkers recruited from recovery groups, who described positive experiences with recovery cafés, dry bars and other community-based mental health/substance use support services. It was important that such facilities were visibly embedded into the community environment, so to make them accessible and distinct from formal help services (e.g. residential rehabilitation services, supported housing), which were generally perceived as unwelcoming, inadequate, and – in some cases – oppressive or threatening. These amenities provided a safe place for people who had experienced drinking problems to build social connections and develop shared understandings of recovery, thus supporting drinking reductions. For people attending, “*everyone is in the same boat*” (Participant 4) and these organisations enabled them to meet new people without facing (as much perceived) judgement and stigma as if they were to pursue new friendships in other community facilities. This helped to create a diverse network of people with similar experiences and to combat the loneliness felt whilst experiencing alcohol use problems. This was reflected in several participants’ accounts:

“...the nice thing about recovery is that when people share their stories and experiences, everybody’s got a different story and a different experience and background but we all share the same thing – the same problem...it’s that problem that we all know, I can explain my thoughts and feelings and that person who could’ve come from far more privilege, or, it doesn’t discriminate, and they get it, they understand and you just don’t find that in life generally.” (Participant 12)

“...coming here, meeting other people, listening to some of their stories, what they go through, helps. It’s like a wake up call, and you hear all people struggling. Cus I thought I was on me own. But erm, far from it. There’s more people going through a lot of stuff.”
(Participant 5)

Community-based recovery services could also help to raise awareness of other amenities that would benefit people seeking further support with their mental health and alcohol use:

“...there’s quite a lot going on on the Wirral, which I never knew about until I started going to [recovery group], that I found out about [support group], [mental health support service] – and they’re within walking distance from where I live. And er, I just wish I’d known sooner.”
(Participant 15)

“...which is like a great resource for erm mental health support. Erm, and they do lots of courses you know like wellbeing and anxiety and very good for advice with benefits, just, it’s just, really helpful...They also signpost to other, like, things, you know, mental health. So if they can’t help, they can signpost to other services, so, it’s a good place to go...” (Participant 12)

12)

One participant who was a current drinker wanting to reduce his intake benefited from volunteering as a staff member at a recovery service. Referring to both the benefits for social support and for being surrounded by norms of abstinence or low-level drinking, he said:

“...now I just work a couple days a week as a volunteer, which I find stress-free and a real enjoyment...I come to [recovery group]. [Recovery group] is a good grounding cus to come to [recovery group], you’ve got to be abstinent from heavy drinking, you can have an occasional drink, which is what I do, but you can’t be a heavy drinker and come here...”

(Participant 19)

Sub-theme 3.2: Role of formal and informal organisations in addressing community issues

Many participants discussed the presence and quality of organisations that work to address community issues. When perceived as being effective (e.g. efficient police response to problems, preservation of greenspace by voluntary groups), these indirectly facilitated reductions in drinking as they helped to preserve valued amenities that were used for alcohol-free enjoyment, and also helped to combat neighbourhood stressors (e.g. crime, area neglect). While several participants acknowledged challenges faced by police with regards to funding, public perception and legislation, some people found that inadequate police response caused stress and frustration, which made cutting down on their alcohol consumption harder. For example:

“...no matter how many times you ring up Liverpool Police, they’ve never got anyone in the area to come and see, and they can’t chase this car or that car because there’s not enough officers... I actually told them if they wanted to, they could set up a camera in my bedroom or outside the window, whatever, and film what goes on in the street cus I’m pissed off with it now. It’s got to the point of, I’ve had enough...” (Participant 13)

It was also common for participants to mention macro-level factors, such as government initiatives and social/housing policy as determinants of individual alcohol use, and these factors trickled down into the neighbourhood environment. For example, one participant praised the Sure Start initiative, initially implemented by the Labour government in 1998, as she *“felt like there was a lot more to access, you know, for families, a lot more services and when that funding was withdrawn, it sort of, kinda got from bad to worse really...”* (Participant 12). Three female participants who were current drinkers and lived on the same street mentioned problems in the alleyway at the end of their road, which *“stunk to high heaven”* and was littered with *“dirty needles and all kinds inside it...dead rats and dirty nappies”* as well as *“weapons”* (Participant 9; see Figure 20).



Figure 20 - Photograph of a nearby alleyway littered with debris (Theme 3)

However, residents had to endure these problems because there was a lack of clarity regarding who was responsible for clearing the area and because efforts to have a gate installed were unsuccessful. This meant that anyone could leave items in the alleyway without repercussions, regardless of whether they resided on that street or not. As explained by one participant, *“the council won’t do it. Liverpool say it’s Sefton’s and Sefton’ll say it’s Liverpool’s*

entry and blah blah blah they're all arguing about it" (Participant 13), while another questioned *"isn't this what council tax is supposed to go to?"* (Participant 17).

There was a sense of distrust towards formal organisations, which was not restricted to the most disadvantaged participants. Those from low-SES neighbourhoods suggested that *"there's too much that needs doing and the kids'll be at the bottom of the pile, same as mental health will be at the bottom of the pile. It's just – it's just the way life is, isn't it? The way the government goes..."* (Participant 17) and *"they're not bothered because they're getting the rent and they're getting the council tax"* (Participant 13). One participant also noted that a "community pub" in her area displays a sign saying: *"all profits go back into local projects', so they earn the money from the drink and plough it back into other projects, which is probably adding to the mental health, so it's like a big cycle..."* (Participant 6).

Those from less deprived neighbourhoods mentioned *"...the rent cap and stuff like that where people can get more money if they knock that down..."* (Participant 20), as well as scepticism regarding public health campaigns visible in the area:

"You know, you see a lot of campaigns, public health campaigns that are saying, you know, that actually reinforce the link between alcohol and violence. Posters on the train, "drinking two pints can you make at risk of being stabbed"... everywhere we're being told that even moderate amounts of alcohol consumption reduce us to the point where we're too witless enough to control our own impulses... and we know that part of what leads us to respond to alcohol is our social expectation of it, right?" (Participant 3)

On the contrary, several participants appreciated input from volunteer groups and community associations. The roles of these groups in preserving natural spaces (e.g. organising "beach cleans", ensuring parks and woodlands were well-maintained) and listed buildings were deemed important as they facilitated access to safe, clean environments for socialising. Some participants actively participated in these groups, which boosted their sense of community, and which may enhance the appeal of informal (as opposed to formal) organisations as community leaders.

Sub-theme 3.3: Accessibility of natural spaces

Natural spaces, such as parks, beaches, canals, farms, and woodlands, were frequently cited and photographed as facilitators of drinking reductions because they promoted mindfulness, relaxation, connection with nature and community, and were desirable places for exercising. Most participants discussed the beauty of natural environments and sense of peace that they found within them. They described these places as being *“like a sanctuary”* (Participant 12) and *“Mother Nature’s artistry”* (Participant 17) – noting that *“there is such beautiful things and you don’t have to drink to access them”* (Participant 6; Figure 21).

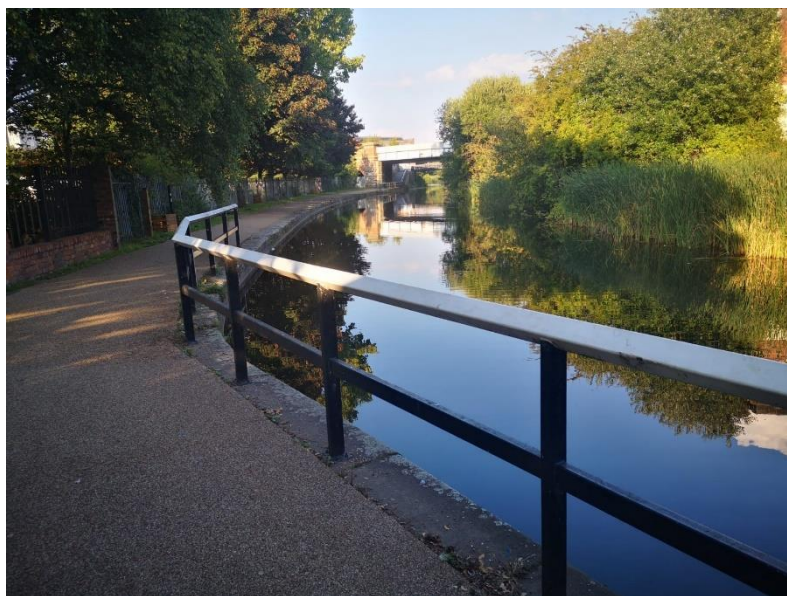


Figure 21 - Photograph of a canal that is *“beautiful”* and has a *“very relaxed atmosphere”* (Theme 3)

Two participants explained:

“I’d go when there’s nobody about so I can just like contemplate things, like you know, try to find some inner peace basically... mindfulness is all about living in the here and now, isn’t it?”

And observing things around you, and that. These places are great for being able to do that... I sort my problems out when I'm running..." (Participant 18; Figure 22 and Figure 23)



Figure 22 - Photograph of a "peaceful" park (Theme 3)



Figure 23 - Photograph depicting a park as a place to engage in physical activity and mindfulness (Theme 3)

"I think the green space maybe kind of like flips something in your mind rather than kind of like a busy metropolitan city and drinking goes hand in hand with that..." (Participant 14)

Participants valued access to well-maintained greenspace and beaches so that they could go walking, running and/or swimming:

"So, I'm kind of really lucky to live in a place where I've got this amazing natural environment and you know, really flat running spaces just outside my door so I'm like two minutes from being able to run along the sea so that's really good. That helps me to control my drinking because when I exercise, you know, I'm in a better place mentally. I'm more relaxed and so I don't feel the need to kind of relax through alcohol as much..." (Participant 3)

This theme overlapped with neighbourhood social cohesion (see Section 6.3.4. Theme 4 for an explanation of how this relates to drinking reductions and abstinence). One participant explained how access to greenspace helped facilitate social cohesion on her street because neighbours participated in walking challenges together. This combination of greenspace accessibility and enhanced social cohesion facilitated drinking reductions as these neighbours collectively set goals to improve their health together. Several participants described going out for walks alone or walking their dogs in nearby parks, which often involved brief social interactions with other people using these places and thus providing a sense of community. Other participants enjoyed seeing people having picnics, playing sports, and feeding the birds, even if they did not directly interact with others in these natural spaces. Situated within academic literature, this may represent a source of cognitive social capital, but these

observations may also signal neighbourhood norms of sober social enrichment to residents. Observing and interacting with wildlife also provided fulfilment and connection, which added to the appeal of natural environments as some participants enjoyed photographing the animals while others felt a sense of reward from taking their children (or grandchildren) to appreciate the natural surroundings.

However, several participants discussed that they thought that natural spaces were prone to public drinking, or they mentioned the emergence of alcohol vendors, particularly on or near beaches. Poor maintenance of natural spaces created a depressing neighbourhood environment that impeded social cohesion (Section 6.3.4. Theme 4) and facilitated neighbourhood disorder (Section 6.3.2. Theme 2). One participant described how *“the duck pond has been empty for five years since I’ve moved there, which is, you know, all the benches are all decrepit. They’ve all got like lichens on them and stuff like that. Nobody ever goes and sits there now...”* (Participant 20; Figure 24).



Figure 24 - Photograph of a park that nobody uses because it is not looked after (Theme 3)

Another participant, in relation to greenspace near her home, explained that *“this one’s a hotspot for drug-dealing because it’s such a – because it’s overgrown and everything, people can slip in and out like that...”* (Participant 15). The benefits of greenery were not only derived from large areas of greenspace (e.g. parks), but that small green features could also promote more positive neighbourhood perceptions. For example, one participant wanted to transform a poorly maintained alleyway into a “community space” with plant pots and artificial grass,

which highlighted the importance of greenery for mental wellbeing but also illustrates how appealing greenspaces provide an arena for social cohesion to develop.

6.3.4. Theme 4: Neighbourhood social cohesion

Neighbourhood social cohesion was perceived to be both a barrier and a facilitator of drinking reductions. High levels of cohesion enabled access to social support, which helped with stress management and the informal dissemination of health-related information, whereas it also encouraged social drinking and led to the exclusion and stigmatisation of residents whose values and/or behaviours were not aligned with the majority. Neighbourhood social cohesion was enhanced by access to greenspace (see sub-theme 3.3.), the presence of bars and pubs (see Section 6.3.1. Theme 1), a diverse range of activities at recreational facilities, and digital means of keeping in contact. With regards to boosting cohesion via technology, participants mentioned using: social media to stay informed about activities and events in their local area; group chats with other residents on instant messaging services (e.g. WhatsApp) to check in on each other's wellbeing; and online platforms (e.g. TripAdvisor) that publish user-generated reviews of local amenities. One participant also discussed using an app to plan walks with her neighbours. However, some participants were less receptive to the digital transformation of society, adding that the shift towards online shopping was responsible for the closure of businesses and lack of variety of amenities (see Section 6.3.2. Theme 2 for an explanation of how these changes were perceived to impact efforts to reduce drinking).

Sub-theme 4.1: The “catch 22” of cohesive neighbourhoods – alcohol as an important aspect of community

While neighbourhood social cohesion was perceived positively by all participants that mentioned this aspect of the area, it was common for these participants to also note the “Catch 22” of cohesive neighbourhoods in relation to alcohol consumption. In several narratives, alcohol played a major role in helping to develop and maintain neighbourhood social cohesion. One participant said:

“It helps. It helps a lot because you’ve got the friendships there, you’ve got people to talk to, to turn to. Erm, but then on the other side, you’ve got people to drink with as well. So, you know, it’s er damned if you do, damned if you don’t... we have a little friendly drink.

Sometimes we can drink more than just a friendly bit. So, yeah, that's what the community does [laughs]. It's what having friends does..." (Participant 17)

Alcohol was used at social gatherings amongst neighbours to foster community togetherness and offset the negative consequences of neighbourhood disorder:

"...that's why we try and counteract it with bringing it back with doing more of the better and happier things. We've had community street parties like erm, community water parties. Everybody else was having jubilee barbecues and being all quite sensible and we had a massive street party..." (Participant 9)

Multiple participants described *"sitting out on their steps, cus we don't have a garden, and a lot of us'll have a drink"* (Participant 10), but failure to monitor alcohol intake was commonly present in these narratives. As such, participants who drank at home with neighbours and/or friends tended to drink higher quantities of alcohol, citing convenience and affordability as reasons for this – factors which also contributed to high levels of 'alcohol accessibility' (Section 6.3.1. Theme 1). Three participants added that certain pubs served as hubs to build social cohesion within the neighbourhood, with one participant referring to the *"community pub"* (Participant 6) and another saying *"particularly there – it does make me feel like part of the community. People'll talk to you..."* (Participant 11).

These narratives suggest that alcohol was used to bring people together, building social cohesion, which in turn reinforced further alcohol use in social gatherings that emerged from greater social cohesion. This points to enhancement and conformity motives as drivers of increased alcohol consumption in cohesive neighbourhoods. Alcohol was used to make social situations more enjoyable and drinking patterns were adjusted to adhere to community norms. Similarly, cohesive neighbourhoods in which there were norms of abstinence or low-level drinking helped to promote healthier communities through improved diffusion of health information and fewer opportunities for social drinking. This was explained by one participant who said: *"we are not drinking so, the other person end up not drinking as well. So it's kind of like a snowball effect..."* (Participant 1). Although drinking with neighbours at home or in the street was generally perceived positively, some participants also mentioned disadvantages of cohesive neighbourhoods in which residents drink together. For example, one participant described how her neighbours would *"...come in and go 'I feel sorry for you, here's a bottle of wine'"* (Participant 4), despite knowing that she was affected by alcohol problems, while another added that cohesive neighbourhoods in which there are norms of polysubstance use can impede efforts to cut down on drinking as well as refrain from drug use:

“...sometimes living round here can be quite dreary. Especially with the neighbours. Cus there are some neighbours that are just toxic people...and that’s another thing about being in this street. Cus there’s a lot of people on cocaine. And cocaine and drinking go hand in hand. So, if we’re having like a street party, which we’ve done a few times, then everyone’s drinking but then it just takes one person to say, “ah let’s get a bag [of cocaine]” and then it’s just a big, snowball effect from there.” (Participant 2; Figure 25)



Figure 25 - Photograph of a street where neighbours can be cohesive as well as "toxic", and where there is sometimes exposure (and conformity) to polysubstance use norms (Theme 4)

Sub-theme 4.2: Perceived and actual social support as a means to reduce stress

Many participants explained that neighbourhood social cohesion enabled access to social support from other residents. This helped with managing stress and facilitated drinking reductions by preventing drinking to cope, providing a sense of fulfilment from low-effort social interactions, and sharing information related to health and wellbeing. Participants described different types of social support that were accessible due to neighbourhood social cohesion, which included: emotional, informational, and practical support.

Emotional support was embodied as encouragement to engage in activities that promote wellbeing, provision of help when seeking sobriety, compassionate interactions, and ensuring that people do not feel alone in times of distress. Participants mentioned family, friends, neighbours, staff members at recovery services, and pets as sources of emotional support. One participant said:

“D’you know what our street seems to be? A place where women come to heal. You know? Because there’s been quite a few of us who’ve gone through breakups in that street, and really supported each other. Erm, a few have gotten through domestic violence and things like that...it’s not the point of going out and watching what’s going on to gossip. Erm, we go out to make sure that she’s okay, yeah. Especially when the man won’t leave type of thing...” (Participant 17)

With regards to informational support, participants described receiving advice about their alcohol consumption as well as updates about what activities, events and services were available in their neighbourhood. One participant did not reach out to formal services for help but discussed strategies to help reduce her alcohol intake, saying:

“...I’ve spoken to a few friends who’ve tried to cut down, and it’s having a plan of what you’re going to actually drink before you go in somewhere...” (Participant 20)

Participant 16 was introduced to a non-alcoholic version of his usual beer, which he switched to and drank occasionally instead of standard alcoholic drinks. In terms of informational support not directly related to alcohol use, one participant attended a community centre that worked largely to support youth in one neighbourhood, and she said:

“...you know, we are a community so if something’s going on, like our friends with kids will make sure we know about it. Because myself and [name of neighbour], we don’t have kids going to a youth club so therefore we don’t really get to know the information...” (Participant 17)

17)

Regarding practical support, one participant explained that his neighbours created a group chat during the COVID-19 lockdown *“so everyone could check up on everyone and see if anyone needed anything. Or if anyone had caught COVID, whether they could ask someone to go out for them...”* (Participant 16). Although he felt that *“if something like that happens again, we would be there looking out for each other...”* he also suggested that the community spirit had dwindled since coming out of the COVID-19 lockdowns. However, this participant also recalled gifting a bottle of wine to his neighbours that provided him with food to thank them. This highlights how norms of reciprocity characterising neighbourhoods rich in social capital can both prevent and promote alcohol consumption, particularly in cultures wherein alcohol holds symbolic value (e.g. as a “thank you”). One participant also described how frequenting certain amenities helps to build cohesion as people become familiar with each other, even if they do not develop strong bonds. When discussing a local off-license as a barrier to drinking reductions, she also added: *“...I get a free bottle of wine at Christmas [laughs]... I think it’s just when you’re a regular They just know my face and you know...”* (Participant 10). Similarly, other participants – some of which had difficulties with mobility– relied on their neighbours to help with buying items from the shop. This again included alcohol in some instances. Not all accounts of practical support involved the provision or receipt of alcohol. For example, Participant 2’s neighbour helped her with childcare. This neighbour had mobility issues so the participant bought her a new wheelchair so that she could attend days out with the family. This again highlights how access to social support can help to reduce stress and enrich individuals’ social lives, while also demonstrating how reciprocity functions to maintain relationships.

However, despite access to social support, some participants were hesitant to seek (informal) help because they did not want to burden others and/or felt guilty. This was mentioned most often by women and, in particular, mothers. For example, one participant said:

“...d’you know what, I’d feel really guilty asking them if it was for – I don’t mind asking them things like if I’ve got the doctors or the hospital or erm work, but if it was for a social thing, I wouldn’t – I probably wouldn’t ask them for that. Like, it feels just guilty and most of them have children and families anyway, so, erm, yeah. I wouldn’t do it. I wouldn’t ask them for any social sort of thing...” (Participant 20)

There was also some indication that some participants were reluctant to ask for help from others if they felt that they could not reciprocate the support. Participant 16 said he would “feel a bit cheeky” seeking support from a local priest, despite knowing him, because he’s “not really a church-goer anymore” whereas another participant, whose sister was supportive during her recovery from alcohol problems, stated: *“I didn’t wanna knock on me sister’s too early cus she would let me in on occasion if she knew I was in bother”* (Participant 4).

The provision of social support to others can also constitute a source of stress. A participant who had struggled with his mental health whilst living in recovery-oriented supported housing perceived to be “like low-level prison” expressed concern about moving out because he worried about his housemate’s wellbeing. He said:

“...but I need to be in there to know what’s going on, cus my housemate – if I go and drop the bomb, I’m scared for him cus his mental health is, it’s, he’s fragile and it’s taken ten months to get him to talk like this. Um, yeah, I’m in two minds.” (Participant 7)

Sub-theme 4.3: Shared understandings of alcohol-related issues vs. stigma associated with alcohol use

While in most cases shared understandings of alcohol-related issues were not explicitly referred to as barriers or facilitators of drinking reductions, many participants discussed how normative perceptions of alcohol-related issues influenced their drinking behaviours, location of alcohol consumption, and attitudes towards drinking.

Some participants directly experienced being judged for their alcohol use by other people in their neighbourhood, which led them to hide their alcohol consumption by drinking at home. For example, one participant recalled:

“...they’d go, “bloody hell, [participant’s name], you stink like a brewer’s handbag!”... And I thought, oh my god, I must stink of a brewery – I must really – but I’d only had a couple of brandies. But I was drinking brandy straight then at the time...and what it is, is she’s a non-drinker and she went to church and everything else, but she was judging me then and I felt like, how can I explain it? Erm, I think I was ashamed, which is – it threw me a little bit because I didn’t want her to think that of me and every time she looks at me now, she just goes [pulls a judgemental face], and she blanks me...” (Participant 13)

This participant explained that her experience of being stigmatised led to her reducing her alcohol intake, saying she *“stopped drinking that day! I think it sort of like sobered me up a little bit...”* (Participant 13). Although, on the surface, this appears to facilitate drinking reductions, she added that *“...now it’s got me a little bit wound up...”* and she would be *“having a ciggy, having a mint”* to mask the smell of alcohol whilst continuing to drink. Other participants did not directly experience stigmatisation but said *“I tend to pace myself when I’m out with people. Erm, I just don’t want to be that person who’s blotto [intoxicated]”* (Participant 10), and would drink at higher quantities when alone at home. Another participant, who had received treatment for alcohol problems several times, drank alcohol at bus stops to hide her drinking from her husband at home and, although she was receptive to help from others, she did not think anyone would help her, nor received any concern. She said:

“...they would’ve either just ignored me or they would’ve cracked a joke, “walk of shame love is it?” or something like that...cus I could’ve, I could take that as an insult couldn’t I? “Ah you okay love, seen you drinking” And it’s what I would’ve liked to have happened, someone to have come up and said “drinking a bit early, aren’t you?” or you know “you alright?”, but no one would, it would be a joke or just a, I think it would just a, I think it would be a joke or just ignoring me...” (Participant 4; Figure 26)



Figure 26 - Photograph of a bus stop where a participant would consume alcohol to avoid drinking at home around their spouse (Theme 4)

However, some former and current drinkers also experienced social exclusion and stigmatisation, which discouraged them from attending social gatherings and thus led to

isolation, which can be a trigger for increased alcohol consumption. Some people actively withdrew from their social networks to avoid alcohol-related consequences:

“And then when they’ve had a drink, it’s worse. So, I just tend to stay away from them. It’s just easier. Take yourself out of the situation...I’ve just taken myself away from certain people and certain groups of people that I know are like the big drinkers and stuff like that, so it’s just easier to stay away now. Keep to me and mine. Not my circus, not my monkeys.”

(Participant 2)

Other participants were less willing to miss out on social interactions in order to be sober but found that their social networks were less likely to include them in social situations that involved alcohol. For example, one participant in recovery said *“when I go round there, it’s a different atmosphere cus I don’t drink...”* so *“it’s like if you’re my mate and I’m inviting all our other mates to come to mine, but I’m not inviting you. It’s not nice. It’s sort of like “how come I’m not invited?”, d’you know what I mean?”* (Participant 5). Several participants also noted how normative perceptions of alcohol use introduced pressure to conform to the drinking norms of the network, venue or wider community. For example:

“And everyone expects you to drink. If you go to a do [social event] and you say erm “oh, I’m not drinking”, it’s as if you’re a leper type of thing! You really stand out as not being one of the crowd. And also, if you go into a place and you don’t drink and everyone else is drinking, you soon become very boring to talk to [laughs]” (Participant 19)

“...you kinda feel their like judgement of you not drinking. So, it’s like “what you doing? Like, what’s up with you? Just have a drink” – d’you know what I mean? Like, that’s difficult. Or like “just let your hair down” d’you know what I mean? And so I don’t know if it’s picking up on that and so I’m like ah I just need to fit into that role...” (Participant 20)

One participant praised greater normalisation of abstinence and low-level drinking for reasons other than being in recovery. This was deemed a facilitator of drinking reductions because it helped to ameliorate the social exclusion faced by non-drinkers, as described above. This enables non- or low-level drinkers to participate in social gatherings, to reap the benefits of social cohesion, and lessens the emphasis on binary views of alcohol problems. He said:

“There’s a lot more sober-living. I also kinda think there’s a shift between like “I haven’t got a drinking problem” and just choosing not to drink, which has made it a bit easier for people to kinda latch onto that rather than “oh I haven’t got a problem”...” (Participant 14)

6.3.5. Theme 5: Neighbourhood socio-economic/demographic composition and neighbourhood identity

The final theme emphasises how neighbourhood identity guides individual drinking behaviours. Participants described how neighbourhood identity was shaped by the socio-economic and demographic composition of residents; the presence of amenities that reflect local arts, culture, and history; residential stability/turnover; and community lifestyle/behavioural norms. Identity may also be shaped through comparison with bordering areas that were perceived as “rough”, which may protect against stigma. As facilitators of drinking reductions, these indicators of identity promoted a sense of pride and ownership of the area, which translated into residents caring for – and helping to maintain – their surroundings. This creates an environment conducive to proactive and healthy norms, and highlights overlap with neighbourhood social cohesion (Section 6.3.4. Theme 4). Neighbourhoods lacking in a sense of ownership over the houses, streets, and/or wider area instead lend themselves to unhealthy (drinking) norms, which are themselves indicative of neighbourhood disorder. In addition to this, however, a sense of ownership over local pubs, particularly in lower-SES neighbourhoods with long-standing communities, can thwart efforts to reduce alcohol consumption.

Sub-theme 5.1: Concern and responsibility for children/youth, older adults, and pets

Several participants were responsible for young children and/or pets, or were actively involved in taking care of older family members. Responsibility for dependents was cited as both a barrier and facilitator of drinking reductions. Some narratives also draw attention to the neighbourhood environment beyond the home because the stress associated with neighbourhood disorder is heightened for residents who want to shield their children from harm (described in greater detail in Theme 2):

“...it’s even people who live in the street, coming up and down the street, absolutely pissed as a fart on a night out, screaming bloody murder, and I’m like, my kids sleep in the front bedroom and me daughter with autism, when she hears fighting or screaming and shouting she gets dead scared, and then she ends up in a meltdown...” (Participant 2)

As a facilitator of drinking reductions, participants described how responsibility for children and/or pets resulted in them drinking less alcohol because it meant they could spend more

time together, compensate for memories lost together during periods of active alcohol use problems, prevent early exposure to alcohol, and it was easier and safer to care for them when sober. Some participants also found that drinking venues attracted “rowdy” clientele who made their children “fearful”, which facilitated efforts to maintain abstinence. Some neighbourhood structures such as community centres hosted family-friendly programs like “Forest School”, which not only provided alcohol-free opportunities for social connection amongst residents of all ages (Sub-theme 3.1.), but also helped to guide children towards socially desirable norms – thus reducing the risk of stress associated with single-parenting and youth-perpetrated antisocial behaviour in the area (Theme 2).

Some mothers in this sample did not have access to childcare (or were reluctant to seek help with childcare) so they were less inclined to drink in on-premise venues. Instead, they would either drink at home or not at all. Joint influences of both neighbourhood social cohesion and having children were also salient in some narratives, particularly for participants living in neighbourhoods where there was a higher proportion of single-parent families. Social cohesion between single mothers living near each other facilitated conformity to low-level drinking norms or abstinence for the most part, for the reasons stated above. This is exemplified by one participant who said:

“...quite a few of them aren’t really big drinkers either, so it’s easier to spend time with them. Cus they have children as well... So, they just decide not to drink, when they know they’ve got their kids. But they’re a single parent so they’ve always got their kids...” (Participant 2)

However, these women were expected to provide childcare so when they did use alcohol, women who were the sole caregivers in their household tended to drink in or around the homes of other neighbours in a similar position as this provided a sense of community and social drinking opportunities without the need to arrange childcare. For example:

“...we’re more likely be closer to her front so that she can have fun without worrying about the kids or leaving the kids, which we don’t condone...” (Participant 17)

Nonetheless, several male participants felt an obligation to refrain from being intoxicated in spaces where they may be seen by children, in order to protect them and prevent exposing them to alcohol at a young age. This highlights the role of injunctive norms as determinants of drinking behaviours. Some male participants were critical of mothers who drink alcohol. They also found that child-friendly pubs facilitated drinking reductions as they were not appealing environments due to children being noisy. It is important to note that the women in the current

sample did not allude to the stigmatisation of mothers who drink.

“Erm, mothers seem to think – not all – but some mothers seem to think it’s ok for them to bring their kids to the pub and to drink, which I think it’s bad in a couple of ways. One: you’re bringing your son up, or daughter up, in a way to – for them to think it’s alright to be doing that, so they’re gonna do the same. Err, two: you know, you shouldn’t really be drunk in charge of children either...” (Participant 19)

“It’s like a really suburban area with lots of schools and I think that would kind of put people off from becoming like severely intoxicated... I think it just kind of makes you think a bit and refrain, I think this idea of like family values, which is not something I’d say is right or believe in, but would kind of go against the grain of drinking...” (Participant 14; Figure 27)



Figure 27 - Photograph of a "School Zone" road sign, which is perceived to discourage heavy drinking (Theme 5)

Some female participants also described their alcohol use in relation to injunctive norms (i.e., 'I should not drink around children'):

“...you’re not gonna come in here drinking or stinking of alcohol or being drunk when there’s kids everywhere. So, you tend not to drink when you’re in front of kids. Well, I don’t anyway...And they haven’t said to you, “no [participant’s name], you can’t drink in here” or

“no, [participant’s name], you can’t come here drunk” – it’s something that I wouldn’t do...”
(Participant 13)

“...you’d hear people outside waiting, you know, families with kids, go the loo and you’re inside having to get this poison down your neck in what is normally quite a fun, family-orientated...” (Participant 4)

However, some mothers in the sample were sceptical about how alcohol was ingrained in school events, for example, through the availability of alcoholic beverages at school events or as raffle prizes (see Theme 1 for an explanation of how alcohol availability and gamification was perceived to impact alcohol use). When probed about her thoughts regarding the presence of alcohol in school events, one of these participants said *“I don’t think it’s particularly great for children to be around”* but she would *“end up talking [herself] round in a circle because is it that children are gonna be exposed to it anyway? Is it better that they see it in a celebratory manner”* (Participant 20). These concerns regarding alcohol in schools were absent from male participants’ narratives.

Sub-theme 5.2: Neighbourhood regeneration and gentrification

Several participants explained that the landscape of amenities in their neighbourhood had drastically changed over the past decade. In some neighbourhoods, the amenities had become more “upmarket” and “hipster”, which was perceived to attract a younger clientele, as well as tourists, to both daytime and night-time venues. There were mixed views on the gentrification of Liverpool and the Wirral more generally. Some participants were wary of the implications for the drinking culture (e.g. loss of traditional pubs amidst an insurgence of “trendy” bars – described in detail below) and rent prices, and others were supportive of the changes, with one participant suggesting *“they’re saying that Liverpool is going to be the next London or something...”* (Participant 10). Some neighbourhoods were perceived to have deteriorated, including the closure of shops, bars, and pubs, which was not welcomed by residents (also covered by Section 6.3.2. Theme 2).

A core aspect of this sub-theme is the decline of traditional pubs amidst the rise of “trendy” drinking establishments. Whether this was seen as a barrier or facilitator (or both) of drinking reductions largely depended on participants’ preferences for drinking venues. Indicative of self-selection into specific niches of drinking venues, participants in the current sample often did not find these amenities appealing or *“couldn’t afford to get drunk here”* (Participant 11).

This meant spending more time in the home – often sober, but at the expense of social interaction in commercial settings (i.e., bars, restaurants).

Despite being supportive of regeneration initiatives in the area, Participant 3 found gentrification of his neighbourhood to be a facilitator of drinking reductions because it meant he was less inclined to go out and drink at *“newer and trendier, more youth-oriented drinking establishments.”* He noted that *“the people that live there see more violence, you know, more disruption, more raucousness at night, um people trying to steal things out of my front garden”* but also discussed advantages of these changes, such as the provision of jobs for locals and the normalisation of “moderate” drinking in settings that provide services besides alcohol sales:

“And now we’ve got this, by contrast, which is a sort of more hipster, urban development. You know, here you can - there’s a cocktail bar, a coffee house, a *barbers*, tattoos, a record shop, there’s live music, there’s tables outside, you know, it’s a much younger – I think it’s a younger vibe. I mean, none of this is by way of judgement, it’s just a shift in kind of the nature of the place. You know, it’s gone from more traditional pubs to more mixed venues with more going on and I think part of that’s really good because it’s not all alcohol-based.”

(Participant 3; Figure 28)



Figure 28 - Photograph of a "hipster, urban development" with a "younger vibe", which is perceived positively (Theme 5)

Another participant found that:

"...if you get out of [neighbourhood] centre, there's a different aura, like vibrant aura. But then, that brings in the tourists which brings in the "ooo, there's the pub! There's [name of pub]!" I've noticed that the pubs are posher now...they were always old man's pubs...The sawdust, smoking, shit and piss on the floor. Now you walk around, it's like "bloody hell, it's Star Trekk, zoom down"..." (Participant 7)

Numerous participants mentioned the availability of craft beer vendors as a barrier to drinking reductions. They found it appealing to drink in these venues because there was less raucousness compared to traditional pubs, the beers and ales were locally brewed, and that they were cleaner and/or more upmarket, suggesting that a more desirable and comfortable environment encouraged drinking. However, Participant 11 explicitly said that the emergence of trendy bars was not a barrier to drinking reductions, but explained that:

“...it’s not that the atmosphere makes it harder, it’s that the atmosphere in other places makes it easier not to drink there. It’s kinda neutral. It’s not stressful. It’s not – I don’t associate it with negative things, it’s more like neutral. Sort of like IKEA, in a way. Nice, clean...” (Participant 11)

This participant perceived that clientele in traditional pubs were *“addicted, they go there to get drunk or to get high or whatever”*, adding that they had a *“kind of atmosphere of despair, poverty, horribleness...”* that deterred drinking in these establishments. On the other hand, some participants felt that clientele in trendy breweries and craft beer vendors would instead visit these places to drink to enjoy the products rather than to become very intoxicated.

Participant 14 discussed enjoying “brunch culture”, which was perceived as *“quite a metropolitan idea”* and was thought to be trendy and inclusive, since *“different variations”* of brunch were available, such as drag brunch (i.e., brunch hosted by drag queens or involving drag entertainers). He also mentioned *“bottomless prosecco brunch”*, which was linked to increased alcohol consumption.

Several participants expressed sadness and frustration at the loss of traditional pubs, for example:

“...[there’s a] sort of community and all those things associated to them...so yeah, I do feel sad for the like decline of the traditional British pub” (Participant 20)

Many participants referred to their local traditional pub as an ‘old man’s pub’ and discussed the prevailing masculine drinking norms in these establishments, which guided heavier drinking behaviours through conformity, thus influencing efforts to cut down on alcohol. These male-dominated venues were associated with aggression and pub sports, such as darts and pool, as well as football and quiz nights. One participant who identified as a gay man found that traditional pubs were *“maybe not the most inclusive pubs. I think they are quite traditional in terms of the attitudes and behaviours, I think they’re quite close-knit...”* (Participant 14). This narrative was shared by other participants, some of which presented pub-based social cohesion positively (e.g. pub licence holders knowing their name, meeting other regular drinkers) whilst some of which felt that this made traditional pub environments more intimidating, whereby *“it’s like you’re invading their [other drinkers] living room”* (Participant 6). Multiple heterosexual male participants explained that they did not like to enter a pub in which they did not know anyone due to anticipated anxiety and perceived threat. One participant

said he would shout a name and wave when he entered a pub to pretend that he knew somebody in the venue. He said:

“I thought “whew, no one’s gonna pick on me in here” cus I got a big gang of lads behind me now, d’you know what I mean? Erm, but these lads were a bit – a bit more erm ready for trouble, kind of lads...I was just an alcy...” (Participant 5)

One participant expressed frustration that these activities were so strongly linked to alcohol because:

“...you’ve had that routine of a Friday, of like I used to enjoy like quiz nights and things. I was actually looking up you know well go for a quiz nights in the likes of [recovery group], like a dry bar, and there was none...there was just nothing at all, and it was frustrating, you know?”
(Participant 12).

The link between pub sports, football and alcohol was perceived as a barrier to drinking reductions by several other participants because they found these activities enjoyable opportunities for socialising but these activities were limited to environments that heavily centred around alcohol:

“I used to love the dart scene and the pool leagues, anything like that. Go from pub to pub... we played in about three different leagues, three or four different leagues, so we’d be out about three or four nights a week when I was home. Um so it was just constant darts and even the nights we weren’t playing leagues and that, we’d go out to the pub and play, just to sort of practice ready for the next one.” (Participant 18; Figure 29)



Figure 29 - Photograph representing a strong link between pub sports (i.e. darts) and consuming alcohol (Theme 5)

Sub-theme 5.3: Preservation of local arts, history, and culture

Landmarks such as listed buildings, murals, memorials, and art pieces helped to provide a sense of neighbourhood identity. Although the narratives about these photographs did not usually relate directly to alcohol consumption, several participants expressed appreciation for, and pride in, the local arts and history. One participant who was developing his photography skills after receiving support for alcohol problems found that, besides constituting a place or landmark that embodies local culture, these places provided attractive content for his photographs:

“...they call it “the wedding cake”, just the monument in there, cus it’s got different layers... the sun was just coming out and it looked beautiful and I thought ‘I’m having that.’”

(Participant 18; Figure 30)



Figure 30 - Photograph of "the wedding cake" monument described as "beautiful" (Theme 5)

Participants also described how these markers of identity attracted local residents as well as tourists, which facilitated social connection (see Section 6.3.4. Theme 4 for an overview of how participants perceived social connection via neighbourhood cohesion to influence their alcohol use). While boosting tourism in the neighbourhood *“puts [neighbourhood] back on the map”* (Participant 3), and helps to promote a more desirable, prideful area, narratives often included concerns about UK drinking culture more generally because tourism in England is a likely factor driving some proportion of alcohol harms (Robinson, Shipton, Walsh, Whyte & McCartney, 2015). Stronger identification with the neighbourhood can encourage conformity

to health-behavioural norms, so the salience of alcohol in local history and culture can hinder drinking reductions and abstinence.

Traditional pubs were also culturally significant and valued aspects of the neighbourhood environment. The erasure of traditional pubs was generally perceived negatively, and this was directly linked to the importance of their history. Hence, the loss of pubs was equated with a loss of community:

“Like, yeah. I really – there’s a real history in them... and like even within the buildings themselves, the history of them and all the people that’ve passed through...” (Participant 20)

One participant photographed and described a themed bar at a well-known racecourse (see Figure 31). This demonstrates how alcohol is heavily integrated into neighbourhood identity, and further highlights the easy accessibility of alcohol (Section 6.3.1. Theme 1).

“We learned all about the history, we learned all about horses and ponies and how to take care of them. And then – but still, 2 minutes to a bar...” (Participant 9; Figure 31)



Figure 31 - Photograph of a themed bar that is "like a museum" and embodies local history (Theme 5)

With regards to the football culture of their neighbourhoods, several participants found that this promoted alcohol consumption in higher quantities than usual. Participant 16 who was abstinent from alcohol recalled saying he would have a pint if his football team won, which led to him drinking alcohol on that occasion. However, football was an important aspect of neighbourhood cohesion (Section 6.3.4. Theme 4) as it brought people together, albeit to consume alcohol, and facilitated a sense of neighbourhood identity. One participant photographed murals in her neighbourhood “on buildings that look a bit eyesore-y otherwise to try and like make it look a bit nicer in the area”, which “*gives a lot of hope as well for the kids in the area*” (Participant 6; Figure 32 and Figure 33). The murals depict the history of the neighbourhood/city and a football player who grew up in her neighbourhood and now provides a great deal of support for the community.



Figure 32 - Photograph of a mural illustrating "the past, where it was the Blitz, to the present" neighbourhood (Theme 5)



Figure 33 - Photograph of a mural illustrating a successful football player from the neighbourhood, which inspires hope in residents - particularly youth (Theme 5)

Reflective comments:

It was originally planned that this would be a photovoice study that would involve a comparison of drinkers living in high- versus low-SES neighbourhoods. Having not ever visited a community centre before conducting this study, I had a preconceived idea that there would be groups of people who would attend given activities on a regular basis, and who may be happy to take part in a focus group together. A focus group would have enabled me to explore tensions and disagreements (as well as points of agreement) within the group regarding what neighbourhood features were perceived as barriers and facilitators. This would have helped to obtain a shared and more nuanced understanding of what it means to be a resident in their neighbourhood and why it might be particularly difficult to reduce their alcohol consumption – reasons which may be distinct from their higher-/lower-SES counterparts.

Other reasons for difficulties with recruitment include possible stigma around alcohol use (e.g. “I don’t have issues with alcohol” from attendees, or “we don’t have alcoholics here, try AA” from community centre staff), the high numbers of non-drinkers encountered, and perceptions that the photography task would require a high degree of artistic skill and/or high commitment. Instead, I chose to conduct one-to-one photo-elicitation interviews with both current and former drinkers, which were extremely valuable and enabled me to identify neighbourhood features that were especially pertinent for former drinkers that were largely absent from current drinkers’ narratives, and vice versa. A potential benefit of this approach over focus groups is that people may have been more willing to share personal details about their drinking patterns and drinking motives when being interviewed on an individual basis. For example, some participants who knew each other shared that it was sometimes their neighbours or other residents in their area that made cutting down on alcohol harder. This might not have been revealed had several residents living close by attended a group interview, and important narratives relating to NSC and social cohesion may have been missed. A more detailed account of these points is presented in Appendix 11.

6.4. Discussion

Current and former drinkers living in Merseyside, UK participated in photo elicitation interviews to elucidate perspectives on neighbourhood barriers and facilitators of reduced alcohol consumption and/or maintaining abstinence. Participants photographed and discussed both physical and social aspects of their neighbourhood, which were captured across five overarching themes: (i) alcohol accessibility; (ii) dissatisfaction and stress related to the living environment; (iii) accessibility and quality of amenities and services; (iv) neighbourhood social cohesion; and (v) neighbourhood socio-economic/demographic composition and neighbourhood identity. There was substantial overlap between the themes, which were largely consistent across both current and former drinkers. Accounts of why neighbourhood problems exist often encompassed narratives regarding macro-level factors beyond the residential living environment, such as neighbourhood-/city-level SES, UK drinking culture, seasonal and weather-related factors, and national policy or government initiatives. Similarly, views on what could be done to tackle neighbourhood barriers to drinking reductions – or, alternatively, to preserve and enhance neighbourhood facilitators – of drinking reductions alluded to some of these macro-level factors.

The narratives shared in this study illustrated that alcohol is pervasive in urban neighbourhoods of the research setting, as revealed through photographs of on-/off-trade premises and alcohol advertisements. Although alcohol accessibility was perceived as a barrier to drinking reductions, on-trade drinking venues were valued amenities that facilitated social connection and often embodied local history and culture, which were important for place-based identity. This collective sense of identity was also guided by other aspects of neighbourhood infrastructure (i.e., recreational facilities, greenspace, local landmarks), which either promoted or hindered neighbourhood cohesion depending on the quality of the amenities. Neighbourhood social cohesion enabled access to social support, which aided drinking reductions via reduced stress but also hindered drinking reductions because alcohol was frequently consumed at community gatherings. The impact of cohesion on alcohol use was most salient in the narratives of current drinkers residing in disadvantaged neighbourhoods, perhaps because there were fewer neighbourhood resources to draw upon when in need of support. Hence, efforts to reduce drinking were sometimes accompanied by social withdrawal to distance oneself from alcohol. Together, these findings help to explain why previous research has found mixed evidence with regards to the association between NSC and alcohol use (Bryden et al, 2013).

Cohesive neighbourhoods were better equipped to combat neighbourhood disorder, which was perceived as stressful and discouraged the use of neighbourhood amenities. In areas characterised by high perceived neighbourhood disorder, social and solitary alcohol consumption was displaced to the home and opportunities for “weak” neighbourhood ties to form were reduced. Neighbourhood disorder has previously been linked to solitary drinking (Perez et al, 2022) and broken windows theory supports the idea that undesirable neighbourhood environments lead to social withdrawal of residents (O'Brien et al, 2019). Preference for home drinking was also influenced the cost of alcohol in on-trade venues relative to off-licenses and shops, as well as neighbourhood regeneration processes, which were thought to favour younger residents. Similarly, a recent US study found that gentrification was associated with higher odds of binge drinking in newer residents who had lived in the neighbourhood for less than five years (Izenberg et al, 2018), so the findings from the current study may suggest social withdrawal of middle-aged adults to avoid exposure to the emerging binge drinking behaviours and harms of younger residents. In addition to convenience and affordability, a lack of informal social control over drinking at home often meant individuals would drink in higher quantities in this context. These themes were consistently identified across accounts from both current and former drinkers, although the latter group also cited the accessibility and quality of substance use-related services as a factor influencing their efforts to maintain abstinence.

The themes identified in the current study largely echo those reported in previous arts-based participatory work that has focused on determinants of drinking behaviours (Molina-de la Fuente et al, 2021) and recovery from alcohol problems (Rhynas et al, 2020; Shortt et al, 2017). Prior PEI studies have also posited similar themes in relation to other health-related behaviours such as physical activity (Sawyer et al, 2018), which supports contentions that certain aspects of urban design may promote “healthier neighbourhoods” overall (Ige-Elegbede et al, 2020). As found in the current study, the themes reported by (Rhynas et al, 2020; Shortt et al, 2017; Sawyer et al, 2018) also interacted, such as the buffering effect of social cohesion on neighbourhood disorder, which is also supported by quantitative analyses (Bjornstrom, Ralston & Kuhl, 2013). Crime rates in Merseyside (105.7 per 1,000 people) are higher than those for the whole of England (90.2 per 1,000 people; ONS, 2024) so neighbourhood social cohesion may be a particularly valued asset in this region. While the role of “neighbourhood social cohesion” was represented by a single theme in this analysis, it had important implications for how other neighbourhood features were perceived to influence efforts to reduce alcohol consumption. These included the ability of the community to maintain greenspace, respond to or cope with neighbourhood disorder, and the segmentation of drinking cultures. Research also suggests that neighbourhood social cohesion modifies the

association between contextual deprivation and mental health (Fone et al, 2007), and that the health benefits associated with social cohesion are accessed via separate pathways for males and females (Momtaz et al, 2014). Momtaz and colleagues (2014) found that, for women, social cohesion impacted wellbeing via emotional support, whereas men benefited from cohesion due to tangible support. Although females in the current sample were more likely to refer to emotional support as a protective factor, these accounts were not exclusive to women, as men shared experiences of emotional support received from their dogs and finding comfort in knowing someone else in a pub so that they did not feel anxious when entering the premise alone.

Previous research suggests that NSC may be more important for older (compared to younger) residents as they enter retirement (Muckenhuber et al, 2013). Participant narratives often emphasised concern regarding the loss of “old men’s pubs”, which can provide a safe environment for regular pub-goers to gain social enrichment. While the decline of traditional pubs may facilitate drinking reductions by reducing the amount of appealing on-trade spaces to drink for this demographic, it may further increase the risks of social exclusion for middle-aged and older adults. There is considerable evidence from previous studies that social exclusion and isolation are major risk factors for poor mental health (Leigh-Hunt et al, 2017). However, the relationship between loneliness and alcohol consumption is less clear and may differ by gender (Canham, Mauro, Kaufmann & Sixsmith, 2016; Johar et al, 2023). Not only were traditional pubs seen as valuable places for socialisation, they were also perceived to embody local history, which complicated the relationship between neighbourhood perceptions and drinking behaviours. This is because indicators of local history helped to provide a sense of neighbourhood identity and ownership that translated into residents caring about the neighbourhood. Previous qualitative work also indicates changes in the role and meanings of pubs situated in gentrifying neighbourhoods, whereby pubs have a deeper social and historical significance for longer-term residents (Ernst & Doucet, 2014). A previous study found that young adults drink less in traditional pubs that cater to an older clientele because they feel “out of place” (Hill, Foxcroft & Pilling, 2018), which further indicates how sense of belonging can impact alcohol use.

The study corroborated evidence of emerging “hipster” alcogenic environments and the social stratification of drinking cultures (Thompson, Milton, Egan & Lock, 2018). For people taking steps to reduce their alcohol consumption or maintain abstinence, the emergence of “trendy” drinking establishments and interjection of alcohol into retail and recreational spaces that do not typically centre around substance use (e.g. coffee shops, barbers) may be perceived as barriers to drinking reductions because engaging in capitalist consumerism plays a key role in

shaping identity and thus (re-)integrating into society (Campbell, 2004). Despite both current and former drinkers in the current study advocating for greater availability of no/lo products, a recent report shows that no/lo products are more often used by younger, more affluent consumers (who, in some circumstances, may be considered “gentrifiers”) and are associated with “trendy” bars (Corfe et al, 2020). However, the shift towards neoliberal discourse in the UK and abroad absolves industry stakeholders and governments of some degree of accountability for alcohol harms since drinking in moderation is seen as the responsibility of the drinker, even if the person is surrounded by cues that encourage drinking (e.g. marketing efforts) (Atkinson, Meadows, Nicholls & Sumnall, 2023). This is particularly relevant to neighbourhood research because, as neoliberalism emerged in Britain, “local government bodies began to advertise their towns and cities as centres of alcohol-based tourism” (p.28, Ellis et al, 2018), which has clear implications for place-based identity. It is well established that a sense of collective identity encourages individuals to conform to descriptive (i.e., what *is* typically done) and injunctive (i.e., what *should* be done) norms (Neville et al, 2021; Reynolds, Subašić & Tindall, 2015).

Research also demonstrates that identifying with one’s neighbourhood directly impacts mental health (Fong, Cruwys, Haslam & Haslam, 2019). As found in the current study, previous studies report mixed attitudes regarding gentrification and regeneration of urban UK neighbourhoods (Bashir & Flint, 2010). However, the potential influence of gentrification on individual alcohol consumption has received little attention in prior research. A recent US study found that residing in gentrifying neighbourhoods was only associated with heightened binge drinking in newer residents (i.e., lived at current address less than five years), although newer residents being “gentrifiers” did not fully explain this observation (Izenberg et al, 2018). The narratives regarding neighbourhood regeneration and gentrification were, to some degree, reflective of Gruenewald’s (2007) niche theory, which posits that “market segmentation” occurs in response to diversifying consumer demand and variation in preferences, which are also driven by the emergence of novel alcoholic beverages or drinking venues.

The study also illustrates how stigma and social exclusion associated with non-drinking can hinder alcohol harm reduction efforts, which has been documented previously (Bartram, Elliott & Crabb, 2017; Jacobs, Conroy & Parke, 2017). Accounts from both current and former drinkers often reflected binary understandings of alcohol problems. A recent article by Morris, Cox, Moss & Reavey (2023) argues that, despite the emergence of a “positive sobriety” movement that is less stigmatising than the more dominant narrative (i.e., binary perceptions) focused on the alcoholic “other”, the experiences of individuals who desire to reduce their alcohol consumption without abstaining are largely overlooked in lay and professional

discourse. However, robust evidence shows denormalisation of alcohol use and normalisation of non-drinking across Western countries (Caluzzi et al, 2022). The experiences of participants in the current study reiterate concerns from Morris et al (2023) as current drinkers who aimed to cut down on (but not abstain from) alcohol faced judgement and pressure to drink in social situations. Perceived judgement towards heavier drinkers also motivated some participants to drink slower or at lower quantities when in social gatherings to avoid perceived stigma. These binary understandings of alcohol problems should not be considered “protective” because the same participants who would moderate their drinking in social settings described drinking to excess in the home, where they would not be judged for their alcohol consumption.

There is mixed evidence on the links between solitary and/or home drinking with higher-intensity drinking, with some studies suggesting a lower risk (Cox, Stevens, Janssen & Jackson, 2022), whilst others suggest that solitary drinking is associated with alcohol problems (Irizar et al, 2020; Wardell et al, 2020). This may be explained by differences in drinking patterns by social class, such that middle-class home drinking may be used as a symbol of sophistication and “bourgeois taste” whereas beverages such as beer and lager may be consumed by other drinkers when watching sport on the television (Brierley-Jones et al, 2014). Another potential explanation for these differences is the impact of the COVID-19 lockdowns on solitary drinking (Roberts et al, 2021). Solitary drinking at home may (Creswell, 2021) or may not be driven by coping motives, so further research is needed to better understand the role of neighbourhood environments in choice of drinking location and subsequent alcohol use. Coping motives have been linked to both weekend and weekday drinking while enhancement motives are more likely to be endorsed during weekend drinking, which is when drinking is more likely (Mezquita et al, 2011).

Former drinkers discussed negative attitudes that they had towards other people experiencing problems with alcohol. This may reflect efforts to distance themselves from stigma associated with AUD and align their identity with societal norms to displace their own (former) drinker identity (Long & Jepsen, 2023; Morris, Moss, Albery & Heather, 2022). It is also possible that binary views of AUD persisted in some former drinkers because they received recovery support based on 12-Step principles (Hassett-Walker, 2023). Evidence suggests twelve step programmes are effective for treating AUD (Kelly, Humphreys & Ferri, 2020), but it would be beneficial for recovery support that encourages drinking *reductions* to also be visible and available in the neighbourhood amenities landscape. This may help to raise awareness of AUD as a continuum, promote self-recognition of risky drinking, and prevent isolating excessive drinkers who do not wish to stop drinking from alcohol-related support (Morris et al, 2022).

Many participants photographed natural spaces such as parks, beaches, and woodlands, which, when well-cared for, were regarded as positive neighbourhood features that facilitated drinking reductions. Participants' descriptions of mindfulness, peace, and appreciation for nature when immersed in these environments lend support to the biophilia hypothesis (Grinde & Patil, 2009) and Attention Restoration Theory (Ohly et al, 2016), which posit that exposure to natural spaces is beneficial for wellbeing through satisfying an evolutionary drive to connect with nature and combating mental fatigue. A photovoice study conducted in the context of recovery from alcohol problems found that nurturing plants at home was sufficient for greenspace to have a positive impact on recovery (Shortt et al, 2017). Alcohol marketing was also typically absent from these natural spaces. However, poorly maintained greenspace promoted negative neighbourhood perceptions. Therefore, greenspace itself may not directly confer health benefits, but that access to well-kept greenspace may promote wellbeing by signalling a high degree of neighbourhood cohesion. Other work suggests that social cohesion may influence the relationship between greenspace exposure and mental health (Dzhambov et al, 2018).

The findings also highlight the need for intersectional approaches to public health research. Intersectionality broadly refers to the complex and various means through which combinations of socioeconomic and demographic factors interact to produce health inequalities or unique social experiences of marginalisation that can impact wellbeing (Cole, 2009; Gkiouleka, Huijts, Beckfield & Bambra, 2018). A key tenet of this approach is that social structures and power imbalances drive intersectional differences in health and health behaviours – as is somewhat illuminated by the current study. One pertinent example of this is the similar narratives shared by mothers of young children, particularly those living in low-income areas. This data demonstrated how the interplay of gender, marital status, the presence of dependents in the household, and social class created stressful circumstances for these participants, which were conducive to alcohol consumption in the home. These experiences were mostly explained by logistical reasons such as not having childcare to be able to go out and socialise. Childcare stress has been linked to excessive drinking (Rutherford & Mayes, 2019), and living in areas characterised by neighbourhood disorder can exacerbate this stress because there are more threats from which maternal figures try to protect their children from. Moreover, women are more severely stigmatised for their drinking behaviours compared to men, and pregnant women's experiences of stigma and shame are well-documented (Stone, 2015).

The study findings support social cognitive theory (Bandura, 1986; Bandura, 2001; Bandura & Walters, 1977) in several ways. Although no specific theme centred around role models, two themes ("neighbourhood social cohesion" and "dissatisfaction and stress related to the

living environment”) highlighted the positive and negative influences of social actors with regards to alcohol use. For example, residents who were proactive in maintaining the neighbourhood by cleaning up litter or lobbying for support from organisations stimulated action from other residents, which helped to tackle neighbourhood disorder (i.e., a barrier to drinking reductions). On the other hand, some pubs were known to be frequented by gang members and/or notorious individuals, which deterred the use of on-trade venues for this sample. In line with social disorganisation theory (Sampson & Groves, 1989; Shaw & McKay, 1942), a lack of neighbourhood (informal) social control may allow these establishments to become hubs for socially undesirable networks, which may foster a threatening neighbourhood environment with increasing levels of neighbourhood disorder.

Drawing on social cognitive theory (Bandura, 2001), neighbourhood features that directly or indirectly promote alcohol consumption may operate without residents’ full awareness of their influence. Throughout the interviews, some participants re-evaluated their initial thoughts on community issues and broadened their perspectives on contextual determinants of health-related behaviours, including alcohol use. For example, one participant contended that his sense of community was not built upon a drinking culture before promptly retracting this statement when realising that *“no, that’s not true, it is to some extent.”* Other participants re-considered more rigid beliefs about gentrification and the sale of alcohol at school events – thinking aloud and debating positives and negatives that they had not previously contemplated. This illustrates the normalisation of alcohol consumption across the study neighbourhoods, as well as the normalisation of oppressive urban environments in which residents expected to be powerless in terms of neighbourhood changes (Gruebner et al, 2017).

Previous participatory studies have also found that residents’ views on their neighbourhood evolved throughout the research process to become more critical of alcogenic features of their surroundings (Molina-de la Fuente et al, 2021). Together with the current findings, this supports the use of collaborative methods for research and policy, as they help to build shared understandings of the local environment. The perceived importance of local history for neighbourhood social dynamics further reiterates a need for research and policy-making to incorporate participatory methods that empower residents to influence the transformation of their living environments over time. Indeed, a recent literature review examining UK strategies used to engage the public in decision-making processes found that a sense of ownership may also promote perceived safety, but cautions that the benefits of participatory approaches may not reach more marginalised individuals or groups (McGrath et al, 2019). Current findings support previous claims that different factions of a city or neighbourhood do not benefit equally

from regeneration processes and that, despite generally positive views on long-term outcomes, these outcomes may be preceded by uncertainty, powerlessness, and a breakdown of social cohesion (Bashir & Flint, 2010).

It is also pertinent that participants' accounts of regeneration were typically positive with regards to city centre developments but that individuals living in less wealthy, residential outskirts areas perceived their neighbourhoods to be deteriorating. Data collection occurred between May and September 2023, so it is important to consider potential seasonal effects on drinking behaviours and neighbourhood interactions. For example, many participants mentioned a propensity towards beer gardens and drinking socially outside in natural environments due to warm weather, whereas other participants briefly referred to the association between alcohol use and winter festivities. Despite frequent mentions of seasonal or weather-related influences on drinking behaviours, this data was not developed into a theme as it was beyond the scope of the research question.

6.4.1. Strengths and limitations

With regards to the data, a limitation of this study is the lack of representativeness of the sample, which consisted of exclusively of white participants. To some extent, this may reflect the demographic profile of Merseyside, as Liverpool has a higher proportion of White residents and a lower proportion of non-White residents compared to statistics reported for England (ONS, 2023). While this afforded a relatively homogeneous sample and may have facilitated data "saturation", the findings do not reflect the experiences or beliefs of non-white populations, who are typically under-represented in health research (Brown et al, 2014; Smart & Harrison, 2017). Factors such as cultural (drinking) norms and ethnic density may impact perceptions of which features of the living environment promote or prevent excessive drinking (Bécares et al, 2011). It is likely that the sample of current drinkers was also biased towards individuals who were more socially active within their neighbourhood because recruitment efforts concentrated on community centre attendees. Participation in community organisations such as community centres is itself an indicator of social capital. Hence, it is expected that more isolated residents, who would perhaps benefit most from access to NSC, were excluded from the research. Despite concerns regarding representativeness, the sample included several participants who identify as sexual minorities. The narratives of these participants were generally similar to those of heterosexual participants, although one of these participants explicitly alluded to their sexual identity as a relevant factor impacting their experiences of drinking in their neighbourhood, thus enriching the data with a greater understanding of the

role of intersectional identities in the neighbourhood-health relationship. Alcohol use problems are more prevalent in LGBT+ populations and there is evidence that social stress and experiences of discrimination explain the disparities between sexual minority and heterosexual groups (Krueger, Fish & Upchurch, 2020).

With regards to the methodology, a number of practical limitations were identified. Firstly, participants were given broad prompts for the photography task (e.g. *“what features of your neighbourhood make cutting down on alcohol harder?”*). This approach aligns with the participatory aspect of the study as participants were able to voice concerns about alcohol-related community issues that they deemed a priority. However, this also made data analysis challenging due to heterogeneous narratives regarding drinking reductions in relation to both the social and physical environment. Similarly, there may have been inconsistencies in perceived neighbourhood boundaries, since the concept of “neighbourhood” was left open to interpretation. For example, some participants focused solely on their street whereas others interpreted their “neighbourhood” more loosely and took photographs in and around areas that would be formally classed as beyond their neighbourhood, as determined by administrative units. Secondly, the ethical guidelines that participants were asked to adhere to when taking photographs may have constrained their narratives regarding the neighbourhood *social* environment. Participants were instructed to avoid taking photographs of people, which may have led them to focus predominantly on the built environment. Several participants mentioned difficulties associated with not photographing people (or indeed submitted photographs of people, which were digitally edited prior to inclusion in this thesis), however, the researcher actively probed the social contexts of the neighbourhood features that were photographed during the interviews. As advised by previous arts-based participatory work (Ronzi et al, 2016), participants were also asked whether there were any features of their neighbourhoods that they would have liked to photograph but did not for any reason, which provided an opportunity for them to discuss important community issues that might not have been raised during the main discussion about their photographs.

This study has numerous strengths. Advantages of PEI more broadly are outlined in Section 3.5. The use of PEI in this study enabled participant-driven exploration of neighbourhood influences on alcohol use, which were less constrained by the researchers’ expectations and interview questions as may be the case in traditional interviews. Prior quantitative analyses demonstrate incongruence between perceived and objectively measured neighbourhood features affecting health-behavioural outcomes (Roda et al, 2016). Therefore, the participatory approach used in this study facilitated access to rich “insider” knowledge about neighbourhood experiences that cannot be obtained via traditional methods. Previous PEI work examining

contextual influences on alcohol has used pre-determined photographs of drinking contexts, which were not taken by participants (Hill et al, 2018). The participatory nature of the current study extends these prior findings by allowing participants to focus on specific aspects of alcogenic (and alcohol-unrelated) environments that are particularly salient to them, and which may not be captured by researcher-driven methods. For example, one participant in the current study photographed a themed bar that showcased important aspects of local history in her area, which heightened the appeal of drinking in that venue. Nuanced understandings of drinking, such as this, are unlikely to be explored in cases where participants are shown a selection of generic drinking contexts.

Another advantage of the study is that all participants attended an initial workshop, which facilitated rapport-building, ensured that practical and ethical guidelines of the study were understood, and offered an opportunity for participants to ask questions about the procedure and their initial ideas for the photography task. This additional step was time-consuming and may have contributed towards participant drop-out. However, it is likely that inclusion of the workshop also aided data richness – by enabling longer, more honest interviews – and helped guide participants to focus on neighbourhood environments rather than individual- and macro-level factors affecting alcohol use. For example, when mind mapping initial ideas for the photography task, some participants suggested factors such as work-related stress, social media and the “Friday feeling”. When asked by the researcher how these factors related to neighbourhood environments, participants sometimes indicated that they had misunderstood the task or had inadvertently shifted their attention away from the neighbourhood aspect of the study before redirecting their focus back to their neighbourhood. A final strength of the study is that both current and former drinkers were included in the study in approximately equal proportions, as were males and females. This enabled inter-group differences to be explored and thus helped to uncover more complex understandings of the role of neighbourhoods in determining alcohol-related outcomes.

6.4.2. Implications

Findings from this study support the development, use and evaluation of socio-ecological models focusing on alcohol consumption as tools to inform policy frameworks and community-based interventions. The narratives presented here highlight independent and interactive effects of social and physical neighbourhood features, which can increase alcohol-related harms. Participant accounts also draw attention to micro- (e.g. household dynamics, friendship groups) and macro-level (e.g. area deprivation, cultural norms, national policy) factors as

being difficult to separate from neighbourhood-level influences on alcohol use. For example, experiences of gentrification and neighbourhood regeneration described by the current sample involved complex processes like housing regulation and alcohol licensing as macro-level determinants, in addition to drinking motives and venue preferences as individual-level determinants. Frameworks that consider these different levels of influence according to a socio-ecological perspective could be beneficial for public health efforts to reduce health inequalities arising from neighbourhood differences in drinking behaviours, and may also help to reduce the risk of unintended harm from community interventions (e.g. minimising the adverse impact of displacement).

Taken together, these insights suggest there is a need for greater public involvement in policy-making and urban planning, which could be improved by forging partnerships between residents and local authority figures. This would help to give residents a sense of ownership over their neighbourhoods, which is likely to have positive implications for social cohesion and collective control over neighbourhood disorder. In turn, more desirable environments may promote healthier behavioural norms, which, in areas of high cohesion, are more likely to be conformed to. It was common for neighbourhood social cohesion to be translated into – and derived from – digital means (e.g. WhatsApp group chats, Facebook groups, other app). Thus, neighbourhood interventions to tackle health risk behaviours may also benefit from online components. There is evidence that online platforms can be useful for developing social cohesion and community resilience (Stewart, Bleumers & Van Looy, 2013; Xie, Pinto & Zhong, 2022). Similarly, social media campaigns such as “Dry January” can also be effective for eliciting drinking reductions that may persist after the challenge has been completed (de Visser et al, 2016), and these harm reduction efforts may be better disseminated in cohesive neighbourhoods. Existing “stocks” of social capital can help to stimulate awareness of, and engagement with, these campaigns. However, empowering neighbourhoods to promote health education via social media may also pose the risk of spreading and consuming misinformation (Wang, McKee, Torbica & Stuckler, 2019).

The study also supports the feasibility and acceptability of arts-based participatory methods (i.e. PEI) for exploring drivers of alcohol use. However, previous research identifies potential weaknesses of participatory activities. For example, partnerships formed via participatory approaches are often unsustainable due to insufficient funding, residents’ views may be ignored (especially if they do not conform to the majority’s desires), there may be conflicting interests between stakeholders, partnerships with organisational leaders may be terminated once funding for participatory activities ceased, and some individuals or groups may not be able to access the research to share their concerns (Cornwall & Jewkes, 1995; Minkler, 2005).

As with all participatory research, it is important to consider how social action or neighbourhood interventions arising from this type of work could further marginalise individuals who are less inclined to participate in community activities and/or already lack a sense of belonging. Interventions to boost neighbourhood social cohesion may provide an impetus for more sustainable grassroots approaches to neighbourhood improvement and collective efforts to tackle alcohol harms. Researchers seeking to employ PEI or similar participatory methods should be mindful of practical challenges involved in recruiting participants endorsing a desire to reduce their alcohol consumption (broader discussion of recruitment barriers is available in Appendix 11).

In line with a socio-ecological perspective, it is beneficial for interventions aiming to improve social capital and alcohol-related outcomes to target both individual- and neighbourhood-level characteristics, in order to promote change at multiple levels. Although there is a scarcity of evidence evaluating the impact of multilevel social capital interventions on public health, findings so far are promising (Villalonga-Olives, Wind & Kawachi, 2018). However, investment in social capital interventions that empower communities to self-regulate alcohol should not substitute measures to improve the socioeconomic and physical conditions of more disadvantaged areas, as safe and appealing places are important for the social interactions to take place. Interventions targeting greenspace present opportunities for a potential “triple win for environmental sustainability, health, and health equity” (p.2), but the success of these interventions is likely to hinge upon accessibility, aesthetics, maintenance, perceived safety, and awareness of these spaces (Kruize et al, 2019). Kruize and colleagues (2019) also advocate for greenspace design to take a participatory approach, whereby stakeholders (e.g. local residents, other potential users of greenspace) are able to influence decision-making regarding how greenspace is utilised, which the authors contend should in turn improve social cohesion, pro-social norms and health-promoting behaviours. These interventions have been found to be particularly effective in low-income neighbourhoods that do not have access to adequate resources to support investment in businesses and other amenities, as parks and other natural spaces are mostly free to use (Rigolon, Browning, McAnirlin & Yoon, 2021). Future research should explore the reciprocal relationships between greenspace, social cohesion and health-related behaviours as causal mechanisms are yet to be established.

In the context of the current study, it is possible that safe and appealing outdoor spaces in disadvantaged neighbourhoods could reduce solitary and/or social drinking in the home, which was linked to greater potential for alcohol harms (i.e., higher intake due to difficulties monitoring alcohol consumption, convenience and affordability of home drinking, lack of informal social control over drinking). Current findings also suggest a need to re-evaluate and

potentially strengthen current regulations regarding alcohol advertising as this was found to be pervasive in shops and main streets. Exposure to such marketing has been linked to higher levels of alcohol consumption and related harms (Bryden et al, 2013), although further evidence is needed. Given that all participants perceived their neighbourhood to have changed in some way over the past decade, it is important that future studies use longitudinal designs to identify what aspects of neighbourhood change pose risks to health.

6.5. Conclusion

This study identified barriers and facilitators of drinking reductions and/or abstinence, as perceived by current and former drinkers living in Merseyside neighbourhoods. Neighbourhood features that influence alcohol reductions and cessation related to both the physical and social environment. The findings suggest that appealing neighbourhood environments conducive to “healthier” drinking habits contain well-maintained greenspace and a diverse selection of amenities, whereas high accessibility to alcohol, particularly due to a high density and close proximity to off-licenses and supermarkets, was perceived as a barrier to drinking reductions. The roles of neighbourhood social cohesion and place-based identity in relation to alcohol consumption were more complex, and these themes had important implications for how other neighbourhood features were perceived to affect efforts to reduce drinking. Strengthening neighbourhood social cohesion and sense of ownership may help to build communities that can self-regulate by tackling neighbourhood disorder and ensuring that the neighbourhood physical environment is kept in good condition so that positive social interactions between residents are more likely to occur. However, interventions to boost social capital and cohesion may not be effective in the absence of efforts to also address socioeconomic deprivation and inadequate neighbourhood infrastructure. Mixed views regarding the impact of gentrification and neighbourhood regeneration on alcohol use and related harms suggest a need for further research in this area, which would benefit from participatory approaches and/or longitudinal designs.

CHAPTER 7: Triangulation and general discussion

The three studies comprising Chapters 4-6 addressed the overarching aim of the PhD: to investigate how neighbourhood social factors influence individual alcohol use. Study 1 synthesised theoretical literature to develop a framework illustrating the pathways from neighbourhood social environments to individual drinking behaviours, which was supported by a systematic review of relevant empirical evidence. Study 2 quantitatively examined individual and neighbourhood predictors of group-based alcohol use trajectories via secondary analysis of a large, English general population dataset. Finally, study 3 used participatory photography to qualitatively explore neighbourhood barriers and facilitators of drinking reductions and abstinence from alcohol in a sample of current and former drinkers residing in Merseyside, England. This chapter aims to triangulate the findings from the three studies to enrich interpretations of the findings and develop a more in-depth understanding of how NSC influences individual alcohol use. The themes developed through the triangulation process are mapped onto the overall objectives of the thesis and used to explain potential implications for future research, policy, and practice. Finally, the strengths and limitations of this research are discussed prior to concluding remarks.

7.1. Triangulation protocol

Triangulation is the process of ‘mixing’ findings obtained from different methods and/or datasets to produce deeper understandings of the research topic that go beyond the conclusions inferred from each individual analysis (see Section 3.6. for further explanation). The findings from all three studies were “mixed” in accordance with Farmer and colleagues’ (2006) triangulation protocol. The six-step procedure (Table 20) was advantageous over other techniques because it was developed in the context of public health and is systematic in its approach to mixing different types and sources of data, which ensures transparency in the mixing process and bolsters the credibility of the overall thesis conclusions. However, the current approach deviates from the original protocol because: (i) only one researcher (rather than multiple researchers) triangulated the findings, and (ii) the method was adapted for mixing qualitative and quantitative results, rather than exclusively mixing different types of qualitative data.

Thematic analysis (Braun & Clarke, 2006; Braun & Clarke, 2019) was conducted on the results and discussion sections of all three studies with consideration of the PhD objectives. Each

study could contribute to various themes that mapped onto the overall objectives because the sequential design meant that preliminary findings from earlier stages of the project could be explored in later stages, despite not directly addressing specific thesis objectives. Similar findings were grouped into themes, which were then named to reflect the “essence” of the theme, and the resultant themes were compared to examine the level of convergence. The degree of convergence was determined based on the meaning and coverage of the themes. Study findings relevant to each theme were categorised as “agreement”, “partial agreement”, “silence” or “dissonance”, in line with the convergence coding criteria outlined in Table 20, and contextualised with reference to the overall PhD objectives in Tables 22-24. Finally, a global assessment of convergence was conducted and reasons for concurrence or non-concurrence were considered with respect to each individual study and in relation to the theme as a whole. Although the researcher comparison step was omitted, the supervisory team was consulted to discuss theme interpretation, which informed final revisions to the overall themes. Findings that were unique to one study were not developed into meta-themes as it was not possible to generate deeper understandings without relevant evidence from the other studies. However, they were considered in step 4 of Table 20 to better understand gaps in the research findings with regards to addressing the overall PhD objectives.

7.2. Legitimation process

To further enhance the validity of the triangulated findings, the triangulation protocol was supplemented by a legitimation process (Onwuegbuzie & Johnson, 2006), which seeks to evaluate the philosophical, methodological, procedural, and sociopolitical justifications put forth throughout the work programme (Onwuegbuzie, Johnson & Collins, 2011). By doing so, mixed methods researchers must live up to certain epistemological standards when deciphering the real world implications of their work. Application of nine types of legitimation composing the typology developed by Onwuegbuzie and Johnson (2006) is presented in Table 21.

Table 21 - *Triangulation protocol adapted from Farmer et al (2006)*

Step	Activity
1. Sorting	The results and discussion sections of all three studies were reviewed and coded (with consideration of the overall PhD objectives) to group together similar findings into themes and identify areas of agreement and divergence.
2. Convergence coding	The findings relating to each new theme were compared to determine the extent of convergence with regards to the meaning and coverage of the theme. The extent of convergence was established based on Farmer and colleagues' (2006) convergence coding scheme: Agreement (A): There was full agreement between the study findings and the theme with regards to both meaning and coverage Partial agreement (PA): Some, but not all, of the study findings demonstrated agreement with the theme Silence (S): No study finding(s) provided evidence specific to the theme Dissonance (D): There was disagreement between study findings with regards to both meaning and coverage
3. Convergence assessment	The themes and relevant study findings were reviewed to determine a global assessment of convergence.
4. Completeness assessment	Key differences between the study findings were considered, and insights that were unique to only one study helped to enhance the completeness of the triangulated findings.

Table 22 - *Application of the legitimization process*

Legitimation type	Application to the current research
Sample integration	The three studies used separate samples of participants, drawn from different populations, which is a potential threat to the validity of the meta-themes. However, study 1 included multiple large, representative datasets and the analyses in study 2 were similarly based on >22,000 participants drawn from a UK national survey. Caution was taken when considering the meta-theme in light of study 3 findings, which were based on a much smaller sample (n=20) of participants in one local region, whose experiences are not generalisable to the wider English population.
Inside-outside	Development of the meta-themes was guided by perspectives of the author, members of the supervisory team, and both current and former drinkers residing in different Merseyside neighbourhoods. This also drew on previous work by social capital theorists. Although theory synthesis (study 1) relied on the author's interpretation of qualitative evidence, study 3 took a participatory approach, which emphasises the importance of "insider knowledge". All three studies were reviewed by the supervisory team and further viewpoints were discussed with researcher-peers at conferences and training courses.
Weakness minimization	The sequential design was advantageous because weaknesses in earlier studies were acknowledged and addressed in the following studies. The large sample sizes used in studies 1 and 2 aided generalisability and validity of statistical analyses, whereas study 3 (qualitative, photo-elicitation interviews) provided richer, more nuanced understandings, which helped to explain mixed quantitative results. The development of meta-themes via the triangulation process further helped to reduce weaknesses by combining findings derived from multiple high-quality datasets and from different methodological approaches.
Sequential	Triangulation was completed after the studies had been conducted and interpreted individually. A three-stage sequential design was adopted but the theoretical framework constructed in study 1 was revisited and revised throughout the programme to update the papers included in the review and reflect where gaps in knowledge could be addressed by subsequent studies (2 and 3). For these reasons, there is a lower risk that the meta-themes would be amenable to change had the qualitative and quantitative aspects of the research been reversed.
Conversion	It was intended that the study 1 framework would be used to guide the design and interpretation of subsequent studies and, due to the limited NSC indicators and alcohol use items available for study 2, quantitative findings played a less salient role in determining meta-themes. The study 2 findings were "qualitised" to develop meta-themes that helped to address the research objectives. However, the triangulation process involved consideration of the prominence, coverage and meaning of the meta-themes, so the "qualitising" and "quantising" of study findings did not hinder the quality of the meta-themes.
Paradigmatic mixing	The work was informed by pragmatism, which facilitated the blending of ontologies and epistemologies adopted in the separate studies because it allows consideration of both subjective and objective interpretations if this is the most practical decision. For example, the positivist nature of study 2 contrasted with the constructivist approach of study 3, but the findings from

	both studies could be mapped onto the study 1 framework and overall PhD objectives. Both inductive and deductive reasoning were used throughout the qualitative syntheses to ensure that relevant theory was considered but that there was also scope for new insights from the author and participants. It was assumed that there are multiple realities, which are socially constructed, because NSC was assessed as <i>perceived</i> neighbourhood conditions in both qualitative and quantitative inquiry.
Commensurability	Commensurability was possible as taking an overall pragmatic approach eased the mixing of worldviews. Reflexive notes also aided “Gestalt switches” between quantitative and qualitative lenses. Study 1 provided a theoretical framework within which to situate quantitative, empirical findings and these, in turn, guided ontological considerations (i.e., alignment with the latent classes identified in study 2) when comparing neighbourhood perceptions of former versus current drinkers in study 3.
Multiple validities	The meta-themes can be considered high in multiple validities. The quantitative components (i.e., empirical literature in study 1 and the study 2 analysis) used validated tools and large samples to address the research questions, while the qualitative components (i.e., theory synthesis and photo-elicitation interviews) were informed by theory and reflexivity that considered the author’s biases as well as participant-generated photographs that helped prevent researcher biases from influencing the data obtained. The qualitative work helped to identify potential reasons for mixed associations reported in quantitative components and so, together, they produced meta-themes that were “greater than the sum of [their] parts” (p.630, Doyle et al, 2016) (i.e., the individual study findings).
Political	Only one researcher collected and analysed the data, but the supervisory team also provided input on the individual studies as well as the meta-themes. Recommendations for research, policy and practice are informed by the meta-themes rather than specific study findings. One potential source of tension is that quantitative findings showed only very weak associations between NSC dimensions – cognitive NSC especially – and alcohol use, whereas theoretical and qualitative evidence suggested that cognitive and structural NSC are important determinants of drinking. There is often a bias towards quantitative research, but the qualitative research here reflects residents’ views of how neighbourhood problems should be prioritised, which is also of high importance for other stakeholders such as urban planners, policymakers, community outreach services, and academics.

7.3. Triangulation of findings

Global assessment of convergence determined that no meta-themes were coded as “dissonant”. Therefore, the meta-themes demonstrated high agreement and the triangulated findings were concluded to be consistent across the studies.

Table 23 - *Triangulation (and level of convergence) of themes related to Objective 1: To examine the direction and strength of associations between NSC and individual alcohol use*

Meta-theme	Study 1	Study 2	Study 3
Overall, there are mixed associations between NSC and alcohol use in the English general population	A	A	A
There are inconsistencies in how “neighbourhood” is defined and conceptualised	A	S	A
There are inconsistencies in how NSC is defined and conceptualised	A	S	PA
NSC promotes moderate alcohol use and binge drinking but protects against AUD	A	PA	PA
The impact of NSC on alcohol use, to some degree, depends on gender	A	PA	A
The impact of NSC on alcohol use, to some degree, depends on age	A	PA	A

Previous research on neighbourhood social determinants of alcohol use has been inconclusive due to mixed (or lack of) evidence (e.g. Bryden et al, 2013). Table 22 presents the meta-themes relating to objective 1 of the thesis. All three studies supported the contention that there are mixed associations between NSC and alcohol use in the English general population, whereby NSC was found to be both positively and negatively associated with individual alcohol use. The review (study 1) was based on samples from “Western” countries but only two studies reported results specific to England. These found that perceived neighbourhood social cohesion was negatively associated with various alcohol outcomes in adults aged 50+ (Ruiz et al, 2019) and in women (Ng Fat et al, 2017) but positively associated with odds of being a drinker in men (Ng Fat et al, 2017). A third study, which included a UK sub-sample, found no association between perceived neighbourhood social cohesion and area-level variation in binge drinking, but UK-specific results could not be separated from those applicable to other European countries (de Gelder et al, 2017). The drinking trajectory classes characterised in Study 2 were distinguishable on the basis of both structural and cognitive NSC, although not all classes differed from the population norm (i.e., “borderliners” as the reference category) with regards to NSC. As also found in Study 1, structural and cognitive components of NSC were differentially associated with alcohol consumption trajectories, with structural NSC being a stronger predictor of class membership than cognitive

NSC. Study 3 was also categorised as agreement because, although no quantitative analysis was carried out, participant narratives explicitly demonstrated that NSC was both a barrier and facilitator of drinking reductions/maintaining abstinence.

Spatial definitions of “neighbourhoods” were heterogeneous in the articles synthesised for Study 1, which reviewed individual-level and multilevel studies that represented neighbourhoods as various administrative units and/or relied on residents’ perceptions of “neighbourhood”. Study 3 had a strong emphasis on co-production so neighbourhood facilitators and barriers of drinking reductions and abstinence were left open to interpretation, thus enabling participants to prioritise the local issues that they found most important. Due to practical and time constraints, perceived neighbourhood boundaries were not established prior to data collection. However, this study was coded as agreement because self-reported neighbourhood of residence in survey responses had different levels of specificity (e.g. “Wirral”, which is formally recognised as a local authority district that is broader than a neighbourhood, versus “Birkenhead”, which comprises part of the electoral ward “Birkenhead and Tranmere” within the Wirral). Descriptions of neighbourhood issues and assets were sometimes with reference to only a few streets surrounding participants’ homes as opposed to the wider neighbourhood environment, whereas other narratives related to town/city centres – conceptualised as “hubs” in previous research that similarly shows how residents perceive neighbourhood boundaries in relation to landmarks and third places (Catney et al, 2019). Study 2 was coded as silence regarding this meta-theme because the UKHLS dataset dictated that neighbourhoods were operationalised as formal administrative units (i.e., LSOAs in study 2). However, it is important to note that UKHLS also included variables for other geographical identifiers such as middle layer super output areas (MSOAs) and local authority districts (e.g. Liverpool, Sefton, Wirral), which could have instead been used to represent neighbourhood boundaries. To aid comparison with previous research, which has typically measured neighbourhoods as LSOAs (Bertotti et al, 2013; Fone et al, 2013), the current research also took this approach. This reiterates a need to establish academic consensus regarding the concept of “neighbourhood” in order to advance understandings of health and place.

Quantitative research synthesised in study 1 based in “Western” countries suggested higher levels of NSC are positively associated with alcohol use outcomes such as drinker status, drinking quantity/frequency, and binge drinking but negatively associated with pathological drinking patterns such as AUD severity and dependence symptoms. Study 2 provides preliminary support for these findings as “moderate drinkers” exhibited the highest scores on membership in organisations (67.32%), volunteering (30.97%), and neighbourhood social cohesion (15.17). “Non-drinkers” had substantially lower scores on all three NSC indicators

(39.80%, 18.69%, and 14.63, respectively), and had the overall lowest NSC compared to all current drinker classes. However, study 2 was coded as partial agreement rather than agreement because “high-risk drinkers” did not differ significantly from the reference category, which represented the population norm (i.e., “borderliners”, the largest class) on any of the NSC indicators, and exhibited comparable levels of membership in organisations (55.99%) to “borderliners” (56.24%) and “low-level drinkers” (55.09%). In Study 3, current drinkers indicated that interacting with local residents and groups often hindered their drinking reductions while former drinkers reported that involvement in community groups – particularly those that were recovery-oriented – helped them to maintain abstinence. However, the findings did not exhibit full agreement because current drinkers wanting to reduce their alcohol intake also described withdrawal from neighbourhood social environments that were conducive to regular or heavy alcohol consumption.

Both quantitative and qualitative evidence across all three studies indicated, to some degree, that individual sociodemographic characteristics influence the relationship between NSC and alcohol use. With regards to gender, Study 1 suggested there were sex differences in the relationship between NSC and alcohol use, whereby NSC was more often protective against alcohol use for women but a promotive factor for men. Theory synthesis suggested that this is likely due to the inclination towards seeking and receiving emotional support amongst women, which can reduce distress and consequent drinking to cope, and the conformity to masculine norms (which typically entail excessive drinking) amongst men. In Study 2, “high-risk drinkers” were more likely to be male whereas lower-level drinkers and non-drinkers were more likely to be female, and the classes could be differentiated on the basis of (cognitive and structural) NSC, as indicated by significant Wald statistics. There were differences in the narratives of male and female participants in Study 3, which contributed to the development of this meta-theme. Motherhood was a salient aspect of several women’s interviews, which discussed difficulties obtaining childcare as a factor promoting home drinking as opposed to on-trade drinking, and as a stressor that played a role in drinking to cope. Men instead tended to consider drinking practices in pubs and bars, wherein other male patrons were sometimes perceived as threatening, which either discouraged on-trade drinking altogether or promoted higher-quantity drinking as a display of masculinity or a means to integrate within networks of strangers. Traditional pubs were often described as being male-dominated – with the environment catering to football fans, involving pub sports such as darts and pool, and sometimes engendering violence and rowdiness. Previous research has shown that drinking practices are gendered (e.g. Atkinson et al, 2022; Brierley-Jones et al, 2014), but these studies mostly rely on individual/network approaches rather than exploring broader contextual factors (i.e., neighbourhood features) that may also have explanatory value.

Similarly, there was evidence of age differences in the relationship between NSC and alcohol use across all studies. Study 2 found that drinking trajectory classes differed significantly with regards to age. The “very-low-level drinkers” class had the lowest proportion of young adults aged 18-34 (11.95%) and the highest proportion of over 65s (35.23%), whereas “high-risk drinkers” had the higher proportions of adults aged 35-49 (36.86%) and 50-64 (37.66%) and relatively lower proportions of adults aged 18-34 (15%) and 65+ (10.48%). Study 3 added that the drinking “sub-cultures” described in Study 1 often aligned with groups based around certain sociodemographic characteristics. For example, “brunch culture” and “trendy” bars were perceived as drinking phenomena unique to younger clientele; locally brewed ales were targeted towards higher SES clientele and were seen as more sophisticated and separate from younger drinking practices; and traditional drinking venues were frequently labelled “old mans pubs” in reference to the typical clientele. Each type of venue was perceived to engender different drinking practices, for example low or moderate levels of drinking for enjoyment of taste in trendy bars or independent establishments with locally produced alcohol compared to more severe intoxication in traditional pubs and brunch events.

Table 24 - *Triangulation (and level of convergence) of themes related to Objective 2: To identify and explore the mechanisms and pathways linking NSC to alcohol use*

Meta-theme	Study 1	Study 2	Study 3
Structural and cognitive NSC operate via different pathways in relation to alcohol use	PA	PA	A
Mental health plays an important role in the relationship between NSC and alcohol use	A	S	A
NSC impacts individual alcohol use via enabling access to perceived and actual social support	A	S	A
NSC impacts psychosocial processes (e.g. self-efficacy, self-esteem) that, in turn, influence alcohol use	A	S	A
Individual residents conform to neighbourhood drinking norms	A	S	PA

Table 23 presents the meta-themes relating to the second objective of this thesis. Study 1 showed that structural NSC and cognitive NSC had different patterns of association with individual alcohol use, whereby structural NSC was tentatively more often positively associated with alcohol outcomes and cognitive NSC typically demonstrated no or negative associations. This is partially supported by the theory synthesis, which illustrated direct links between structural NSC and alcohol use (e.g. civic and social participation increase exposure to social drinking opportunities) but suggested indirect links between cognitive NSC and alcohol use that are likely to operate via mental health. However, structural and cognitive dimensions of NSC operate reciprocally in relation to each other, i.e., positive experiences of structural NSC promote increased cognitive NSC and vice versa. This suggests that two

separate pathways may not be involved, but that differential levels of NSC, in combination, have unique influences on drinking (e.g. high participation, low trust). This concurs with the miniaturisation of community concept (Lindström, 2005a; Lindström, Pirouzifard & Rosvall, 2021), which has been found to be related to increased alcohol consumption in Sweden (Lindström, 2005a). Study 2 showed that structural NSC was more strongly related to alcohol use (i.e., as trajectory classes) than cognitive NSC, but added that even different indicators of structural NSC may have different effects on alcohol consumption. For example, “low-level drinkers” were significantly more likely than the reference category (“borderliners”) to have volunteered (i.e., civic engagement) but significantly less likely to have membership in an organisation (i.e., social participation). Study 3 was coded as agreement since the narratives generally aligned with the theoretical contentions of study 1. Participants who were current drinkers reported that structural NSC (i.e., interacting with neighbours, attending social events and gatherings) promoted alcohol use because it increased opportunities to drink and encouraged conformity to drinking norms. These narratives emphasised the symbolic value of alcohol, such as the gifting of alcohol as a “thank you”, the cultural importance of drinking at special occasions, and the salience of alcohol in English “third places” (e.g. pubs). Study 3 also alluded to the benefits of social support afforded by NSC, which prevented drinking to cope, as theorised by Study 1. However, Study 3 also posited a direct link between cognitive NSC and drinking as social/public drinking helped to build a sense of belonging, which further fuelled alcohol consumption in these settings, as explained by the identity mechanisms described in Study 1. Former drinkers provided an alternative perspective by explaining how structural NSC embedded in alcohol-free spaces helped to maintain abstinence and also promoted cognitive NSC, although the trust and sense of belonging typically pertained to recovery-oriented networks rather than a more global sense of cognitive NSC.

The theoretical framework constructed in Study 1 posited that higher levels of NSC can promote positive self-perceptions, such as self-esteem and self-efficacy, which were theorised to reduce drinking to cope. The empirical studies included in Study 1 did not measure self-perceptions so they offered little evidence to support this contention. However, several participants in Study 3 described how membership in organisations (e.g. recovery-oriented groups, community centres), in which attendees were familiar with one another and had positive social interactions, helped to promote self-perceptions, which in turn aided drinking reductions and/or efforts to remain abstinent. Study 3 offered a more nuanced understanding of this potential mechanism, which is that improvements in self-perceptions occurred in situations that involved bridging NSC and group-based skill development, such as yoga sessions, vocational courses, and creative activities. Social participation in these activities promoted a personal sense of confidence, pride, and achievement, which lessened drinking

due to enhanced perceived ability to cope with stress and also served as a distraction from alcohol. Study 2 was coded as silence because no measure of self-efficacy or self-esteem was included, as this data was not available for the waves of interest (e.g., generalised self-efficacy measured at Wave 5 only, which was prior to the analytic period).

Both Study 1 and Study 3 showed that NSC facilitated access to social support, which often helped to reduce drinking through buffering the effects of adverse effects of neighbourhood stressors (e.g. neighbourhood disorder and deterioration) on their mental health. However, both studies also suggested that social support, afforded by high levels of NSC, can promote drinking by increasing drinking opportunities and promoting conformity to neighbourhood drinking norms. Study 3 was coded as partial agreement with regards to conformity to drinking norms because some participants explained that neighbourhoods harbouring risky drinking norms were detrimental to their efforts to reduce their alcohol intake so, rather than conforming to the drinking norms, they actively disconnected from social networks within the area to mitigate these unhealthy influences. Study 2 was coded as silence because neighbourhood drinking norms were not assessed as could not be included as a mediator.

Table 25 - *Triangulation (and level of convergence) of themes related to Objective 3: To examine whether – and how – NSC predicts drinking practices and alcohol consumption trajectories*

Meta-theme	Study 1	Study 2	Study 3
NSC predicts alcohol consumption trajectories	PA	A	A
Drinking cessation is often accompanied by a decline in perceived NSC or a loss of social connection at the network level	A	S	A
Maintenance of non-drinking often involves improvements in NSC for individuals in recovery from alcohol problems but may be associated with worsening NSC among individuals reducing their drinking from non-dependent levels	PA	PA	A

Meta-themes relating to the third objective of this thesis are presented in Table 24. Study 2 specifically examined whether NSC predicted drinking trajectories in a large sample of the English general population and found that the six trajectory classes were distinguishable based on cognitive and structural dimensions of NSC. Study 3 included a prompt that directly assessed perceived change in Merseyside socio-structural environments and its relation to drinking practices. No other study conducted in this programme of work assessed neighbourhoods as dynamic phenomena that change over time. Participants explained how rising crime and disorder in tandem with diminishing NSC led to less on-trade drinking. They

also perceived gentrification processes as, at least in part, responsible for the simultaneous loss of traditional pubs and rise of trendy bars, which were described as giving rise to particular types of social capital and, in turn, particular drinking practices. Note that these narratives related to both perceived changes in drinking habits of others in the area as well as participants' own drinking patterns.

7.5. Strengths and limitations

This section discusses the strengths and weaknesses of the thesis as a whole. The strengths and weaknesses unique to each individual study are considered in their respective chapters, so this discussion centres primarily on the triangulated findings and remaining knowledge gaps.

The use of mixed methods was advantageous because resident involvement in the research process (study 3) granted access to detailed first-hand accounts of neighbourhood assets or problems, which aligned with large-scale quantitative analyses (studies 1 and 2) and, together, produced results with high ecological validity. Furthermore, the use of participatory photography enabled participants to highlight neighbourhood matters important to them with limited researcher constraints on the discussion content. The triangulation protocol helped to generate more in-depth understandings of the role of NSC in determining drinking practices, as well as in the relationship between mental health and alcohol use. Despite being undertaken by only one researcher, the triangulated findings were verified with the supervisory team and thus considered multiple viewpoints regarding interpretation of the themes. The overall inferences are likely to reflect the author's biases, but some reflexive notes logged throughout the PhD programme are included to increase transparency of qualitative syntheses.

The development and use of a theoretical framework to guide studies 1 and 2 was a strength of this programme of work and addresses earlier calls for theory-informed analyses in this field (Diez-Roux & Mair, 2010; Pickett & Pearl, 2001). Identification of potential mechanisms linking neighbourhood factors to individual health risk behaviours can guide variable selection in future research, which can help work towards establishing causal mechanisms. The multidisciplinary approach to theory identification and synthesis was particularly useful because NSC and related concepts are complex and multifaceted phenomena, which can be better elucidated with integration of sociological, psychological, and criminological ideas. Adoption of a sequential study design meant that various aspects of the multidisciplinary

framework could be examined in studies 2 and 3. Another strength of the research programme is that changes in alcohol use patterns over time were considered to varying degrees in each study. This helps to address the lack of longitudinal research in this area (Bryden et al, 2013) and inform future research examining causative effects of neighbourhood environments. Aspects of studies 1 and 2 accounted for the multilevel data structure (i.e., residents nested within neighbourhoods), which helped to separate individual- from neighbourhood-level processes. Qualitative work (study 3) also enabled comparison of neighbourhood experiences between current and former drinkers and led to further insight into gender differences in neighbourhood-based drinking practices. Although neighbourhood change was not investigated in studies 1 and 2, the theoretical framework posited that other macro-level factors such as area socioeconomic deprivation shaped neighbourhood perceptions, which in turn influence network relations and consequently individual alcohol use – emphasising the importance of recognising neighbourhood change in future analyses. Study 3 shed light on this matter by exploring perceived neighbourhood and city-level change in relation to drinking reductions and abstinence. The findings supported the need to account for changing neighbourhood social and physical landscapes in future research, and further confirms the need for more longitudinal studies.

Reflecting a theme developed during triangulation, a limitation of the thesis is that conceptualisations of “neighbourhood” and NSC were inconsistent across the three studies, which impeded comparison of findings. However, this criticism also extends to neighbourhood research more broadly (Kwan, 2012; Oberndorfer et al, 2022) and previous work suggests that the perceived neighbourhood is more important than objective neighbourhood boundaries for determining health behaviours (Roda et al, 2016). The PHDCN tool (Sampson et al, 1997) was used in studies 2 and 3 to measure neighbourhood social cohesion, and variations of these items or similar tools were used in the studies included in study 1. Similarly, structural social capital was assessed as civic and social participation and/or social interactions with neighbours in all three studies, with study 3 participants being administered the same questions used in study 2. These items again differed somewhat from those used in study 1, and often did not specify whether the types of participation or interactions occurred specifically within the neighbourhood environment. Hence, it is unclear to what extent participants travelled beyond their neighbourhoods to access sources of social capital and how these extra-neighbourhood resources differed from intra-neighbourhood resources with regards to their influence on drinking practices.

All studies, to varying degrees, lacked representation from non-White and low SES populations, despite efforts to obtain input from diverse sociodemographic backgrounds when

primary data collection was conducted. Although an ethnic minority and immigrant booster sample formed part of the UKHLS dataset analysed in study 2, these participants were not administered the neighbourhood module and therefore could not be included in conditional analyses due to design. The overall findings are therefore not representative of the English general population. It could also be inferred that the results are biased towards individuals who are most proactive in their communities, which would indicate skewed NSC metrics suggestive of more favourable neighbourhood environments than might be true of the general population. For example, well-connected members of a neighbourhood are more likely to be exposed to opportunities to engage in research and use trustful relationships to better understand the purpose and required involvement of the research – as posited by diffusion of innovations theory (Kawachi & Berkman, 2000; Rogers, 1995), which constituted an important aspect of the integrated framework developed in Study 1. Revisiting the conceptual critique offered by Portes (1998; Section 1.2.2.), this limitation also speaks to the enduring tautology of NSC – conceptualised as an outcome of its indicators.

Despite using a theoretical framework to guide subsequent investigations, it is not possible to make conclusions regarding cause and effect. Longitudinal empirical evidence synthesised in Study 1 was inconclusive due to mixed findings, while Study 2 favoured the use of LCGA over cross-lagged models, since it aimed to characterise drinking trajectory groups on the basis of individual and neighbourhood factors, and lacked sufficient alcohol use data to examine quadratic time. Baseline NSC was significantly associated with drinking trajectory class membership, though all classes exhibited stable alcohol use patterns over time. However, study 3 considered neighbourhood environments as dynamic rather than static entities, and found that neighbourhood changes (e.g. urban development and gentrification, closure of amenities, increased crime, the niching of drinking venues) were perceived by residents to stimulate changes in both individual and collective drinking practices.

7.6. Recommendations for future research

- Further work is needed to establish NSC as a useful concept for public health research. Neighbourhood research would benefit from a definition of NSC that evades circular reasoning and clearly demarcates *how* NSC is developed versus *what* NSC is. Given the mixed evidence regarding the association between NSC and alcohol use, in addition to evidence suggesting that the various dimensions of NSC are differentially related to drinking, there is little evidence to suggest whether composite measures are advantageous over more specific tools that tap into separate aspects of NSC. Drawing

on the concept of “miniaturisation of community” (Lindström, 2003; i.e., high participation combined with low trust has unique implications for health behaviours), it may be useful to assess structural and cognitive NSC separately, and to examine how different combinations of these metrics impact upon drinking practices. This may help to elucidate the mechanisms linking NSC to alcohol use, and to better understand what types of neighbourhood environments activate specific theorised pathways (study 1). Future quantitative research should use multilevel analyses to separate individual- from neighbourhood-level effects, and provide a more comprehensive understanding of the level at which the theorised processes occur.

- The social contexts of drinking within and beyond the neighbourhood warrant future investigation, as event-level data could provide important insight into the reasons collective drinking practices differ across neighbourhood social spaces (study 3). For example, indicators of (structural) NSC such as interactions with neighbours and membership in organisations or voluntary groups may involve drinking or, on the other hand, may constitute recovery-oriented groups that actively work to support abstinence. Indeed, this was often the case for participants in study 3. Qualitative inquiry in neighbourhood research relating to health behaviours is currently sparse, and it would help to map perceived barriers and facilitators of alcohol use onto NSC dimensions on a larger scale. This reiterates the value of socioecological models for understanding health risk behaviours such as alcohol use, as the pervasion of alcohol in the built and cultural environment had important implications for the development of NSC and its role as a determinant of drinking practices.
- It is important for future research to boost recruitment of marginalised groups, such as non-White and socioeconomically disadvantaged populations, given the consistent under-representation of these groups throughout the entire programme of research. Non-White groups may have different cultural norms and attitudes towards alcohol, which is likely to affect how drinkers are perceived and treated by other residents. While alcohol plays an important role in community relations within the UK (as found by study 3), alcohol consumption is less tolerated by some religious or ethnic sects, which tend to cluster geographically. As such, these groups may face different barriers and facilitators of alcohol use, that are not well documented in existing research.
- Participatory approaches would be especially useful for exploring perceived neighbourhood factors influencing alcohol use in a minority health context. However, the value of participatory work in continued investigation of drinking determinants in the general population is also supported by this research programme. Photo-elicitation interviews and photovoice have high potential to uncover nuanced understandings of

how features of the social and built environment interact in relation to health behaviours, as participant-led discussions guided by visual tools (i.e., photographs) facilitate exploration of community issues deemed important to residents. This can help to inform interventions that are both feasible and acceptable.

- The (neighbourhood) social experiences of non-drinkers are poorly understood, so future research should consider predictors of non-drinking and explore the socio-spatial contexts of non-drinkers' network relations. This work should differentiate former drinkers from lifetime abstainers. Further research is also needed to understand the experiences of moderate drinkers to determine what social conditions are conducive to greater alcohol-related harms than others.
- The findings from this programme of research help to better understand the alcohol harm paradox as differences in alcohol consumption (including non-drinking) and drinking practices were observed across a socioeconomic gradient. Future research investigating the alcohol harm paradox could benefit from inclusion of NSC variables and/or metrics indicative of social drinking contexts. This would allow for potential interactive effects between neighbourhood socioeconomic and social factors to be explored, and thus help to identify groups at higher risk of alcohol-related harm. Developing a better understanding of how structural NSC and cognitive NSC operate under varying socioeconomic conditions can guide public health interventions that target drinking contexts and mental health.

7.7. Recommendations for policy and practice

- City councils and local authorities should move towards an assets-based approach for more sustainable community development. Government funding remains of high importance for ensuring the provision and maintenance of valued neighbourhood assets that can help to reduce alcohol harms by affording recreational spaces in which residents can build NSC and engage in activities beneficial for health and wellbeing (e.g. exercise, creative skills, low-effort socialising), with and without the involvement of alcohol. Taking an assets-based approach can help to preserve or enhance a sense of neighbourhood identity, which alongside efforts to reduce population alcohol consumption can facilitate a collective shift towards less harmful drinking norms. Greenspace in particular should be well-maintained and accessible for the purposes of leisure, mindfulness, and exercise – all of which can provide a distraction from alcohol and/or reduce drinking to cope with psychological distress.

- Neighbourhood partnerships between public health professionals, community services, residents, and government departments should promote visible recovery through informal organisations such as recovery cafes, which signal hope and sanctuary for residents experiencing alcohol use problems. Visible recovery can bring awareness of alcohol-related issues to the wider neighbourhood and provide an alternative source of support from formal healthcare services, which may be perceived as stigmatising or difficult to access. Dissemination of materials related to social media campaigns and app-based health promotion amongst residents may also help to prevent and reduce alcohol harms by diffusing health-related information across the neighbourhood and offering a stimulus for increased motivation to have more drink-free days. Neighbourhood partnerships should also involve residents in urban development initiatives or at least consider the level of acceptability of planned neighbourhood change. Unfavourable neighbourhood environments discourage social and civic participation, thereby undermining NSC and giving rise to opportunities for crime and deviance, which take a toll on residents' mental health and can consequently lead to drinking to cope.
- There is a need for measures aiming to increase NSC, but these measures should be implemented with caution. Although boosting NSC may be protective against the onset of AUD, individuals who are already experiencing alcohol-related problems and social exclusion from mainstream society may benefit less so from NSC interventions. In other words, moderate drinkers who are more likely to interact within their neighbourhoods and perceive their area positively will be among the first to be exposed to the intervention, and will consequently have greater power in shaping the neighbourhood social environment. Therefore, the potential for NSC interventions to worsen health and social inequalities should be considered. Interventions likely to be useful in the context of NSC and drinking include those designed to tackle alcohol-related stigma and those intending to promote engagement in, and maintenance of, neighbourhood assets available to all, such as greenspace. These strategies may be advantageous for developing bridging ties between individuals of various sociodemographic backgrounds and facilitating tolerance and respect for individual differences.
- In practice, alcohol treatment services should be sensitive to individual, network, neighbourhood, and wider macro-level factors that might help or hinder efforts to reduce or cease alcohol consumption. Aftercare services especially should involve strategies to prevent loneliness and isolation throughout the recovery process, so that service users are better equipped for community (re-)integration without returning to

problematic drinking patterns amongst existing social networks whose interactions typically involve heavy drinking.

7.8. Concluding remarks

This thesis used mixed methods to investigate the role of neighbourhood social factors in determining individual alcohol use. Overall, the findings suggest both promotive and protective effects of NSC on alcohol use, with stronger evidence for individual-level perceptions of NSC than for NSC as a contextual-level asset. However, there is limited longitudinal and multilevel research available to establish causation and test theorised mechanisms underlying these relationships. The research offers a novel interpretation of how NSC influences drinking practices, which posits differential effects of cognitive and structural domains. This is supported by both quantitative and qualitative data, the latter of which provided greater insight into the role of NSC in determining drinking contexts as well as level of consumption. The importance of NSC in relation to alcohol use lies in its potential to shape drinking norms, improve self-perceptions, and provide a sense of security through perceived and actual social support. Despite being beyond the scope of this thesis, consideration of other macro-level factors such as area disadvantage, neighbourhood crime and disorder, social and housing policy, physical neighbourhood features, and sociocultural factors was crucial for understanding area differences in NSC and drinking practices. It is recommended that future neighbourhood initiatives capitalise on existing assets, such as greenspace, local talents and history, and valued amenities, to support health promotion. Efforts to increase NSC can also be useful and may help to prevent coping motives and pathological drinking problems. However, there is a risk that the benefits of NSC interventions could be shared unequally across community members, whereby those on the peripheries of society may be further marginalised. Participatory approaches to research, policy development, and urban regeneration will be useful for ensuring neighbourhood changes are acceptable to residents and effectively promote use of these spaces. Some of these spaces could be used to increase the visibility of recovery groups and work towards improving social integration of former drinkers and non-drinkers.

References

- Adams, J., & Nettle, D. (2009). Time perspective, personality and smoking, body mass, and physical activity: An empirical study. *British Journal of Health Psychology*, 14(1), 83-105. <https://doi.org/10.1348/135910708X299664>
- Adams, P. J. (2016). Switching to a Social Approach to Addiction: Implications for Theory and Practice [Article]. *International Journal of Mental Health and Addiction*, 14(1), 86-94. <https://doi.org/10.1007/s11469-015-9588-4>
- Adler, P. S., & Kwon, S. W. (2002). Social capital: Prospects for a new concept. *Academy of Management Review*, 27(1), 17-40. <https://doi.org/10.5465/amr.2002.5922314>
- Ahern, J., Balzer, L., & Galea, S. (2015). The roles of outlet density and norms in alcohol use disorder. *Drug and Alcohol Dependence*, 151, 144-150. <https://doi.org/10.1016/j.drugalcdep.2015.03.014>
- Aiken, A., Lam, T., Gilmore, W., Burns, L., Chikritzhs, T., Lenton, S., ... & Allsop, S. (2018). Youth perceptions of alcohol advertising: are current advertising regulations working?. *Australian and New Zealand Journal of Public Health*, 42(3), 234-239. <https://doi.org/10.1111/1753-6405.12792>
- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In *Action control: From cognition to behavior* (pp. 11-39). Berlin, Heidelberg: Springer Berlin Heidelberg.
- Alcalá, H. E., Sharif, M. Z., & Albert, S. L. (2016). Social cohesion and the smoking behaviors of adults living with children. *Addictive Behaviors*, 53, 201-205. <https://doi.org/https://doi.org/10.1016/j.addbeh.2015.10.022>
- Alcohol Change UK. (n.d.). *Alcohol statistics*. Available at: <https://alcoholchange.org.uk/alcohol-facts/fact-sheets/alcohol-statistics> (Accessed 12 June 2024)
- Alcoholics Anonymous. (2024). *The A.A. Group ...where it all begins*. Alcoholics Anonymous World Services. Available at: https://www.aa.org/sites/default/files/literature/P-16_0624.pdf (Accessed 19 July 2024)
- Alcoholics Anonymous. (n.d.). *12 steps*. Available at: <https://www.alcoholics-anonymous.org.uk/about-aa/what-is-aa/12-steps/> (Accessed 19 July 2024)
- Almedom, A. M. (2005). Social capital and mental health: An interdisciplinary review of primary evidence. *Social Science & Medicine*, 61(5), 943-964. <https://doi.org/10.1016/j.socscimed.2004.12.025>
- Almedom, A. M., & Glandon, D. (2008). Social Capital and Mental Health. In: Kawachi, I., Subramanian, S., Kim, D. (eds) *Social Capital and Health*. Springer, New York, NY. https://doi.org/10.1007/978-0-387-71311-3_9
- Alsuhaibani, R., Smith, D. C., Lowrie, R., Aljhani, S., & Paudyal, V. (2021). Scope, quality and inclusivity of international clinical guidelines on mental health and substance abuse in relation to dual diagnosis, social and community outcomes: a systematic review. *BMC Psychiatry*, 21(1), 209. <https://doi.org/10.1186/s12888-021-03188-0>
- Alvidrez, J., Greenwood, G. L., Johnson, T. L., & Parker, K. L. (2021). Intersectionality in public health research: A view from the National Institutes of Health. *American Journal of Public Health*, 111(1), 95-97. <https://doi.org/10.2105/AJPH.2020.305986>
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. <https://doi.org/10.1176/appi.books.9780890425596>
- American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders (5th ed., text rev.)*. <https://doi.org/10.1176/appi.books.9780890425787>
- American Psychological Association. (2018, September). *Understanding alcohol use disorders and their treatment*. Available at: <https://www.apa.org/topics/substance-use-abuse-addiction/alcohol-disorders> (Accessed 18 July 2024)

- Anderson, P., Kokole, D., Jané Llopis, E., Burton, R., & Lachenmeier, D. W. (2022). Lower strength alcohol products—a realist review-based road map for European policy making. *Nutrients*, 14(18), 3779. <https://doi.org/10.3390/nu14183779>
- Anderson, P., O'Donnell, A., Llopis, E. J., & Kaner, E. (2022). The COVID-19 alcohol paradox: British household purchases during 2020 compared with 2015-2019. *PLoS One*, 17(1), e0261609. <https://doi.org/10.1371/journal.pone.0261609>
- Andrews, J. O., Mueller, M., Newman, S. D., Magwood, G., Ahluwalia, J. S., White, K., & Tingen, M. S. (2014). The association of individual and neighborhood social cohesion, stressors, and crime on smoking status among African-American women in southeastern US subsidized housing neighborhoods. *Journal of Urban Health : bulletin of the New York Academy of Medicine*, 91(6), 1158-1174. <https://doi.org/10.1007/s11524-014-9911-6>
- Anguera, M. T., Blanco-Villaseñor, A., Losada, J. L., Sánchez-Algarra, P., & Onwuegbuzie, A. J. (2018). Revisiting the difference between mixed methods and multimethods: Is it all in the name?. *Quality & Quantity*, 52, 2757-2770. <https://doi.org/10.1007/s11135-018-0700-2>
- Anjara, S. G., Bonetto, C., Van Bortel, T., & Brayne, C. (2020). Using the GHQ-12 to screen for mental health problems among primary care patients: psychometrics and practical considerations. *International Journal of Mental Health Systems*, 14, 1-13. <https://doi.org/10.1186/s13033-020-00397-0>
- Anton, R. F., O'Malley, S. S., Ciraulo, D. A., Cisler, R. A., Couper, D., Donovan, D. M., ... & COMBINE Study Research Group. (2006). Combined pharmacotherapies and behavioral interventions for alcohol dependence: the COMBINE study: a randomized controlled trial. *Jama*, 295(17), 2003-2017. <https://doi.org/10.1001/jama.295.17.2003>
- Arcaya, M. C., Tucker-Seeley, R. D., Kim, R., Schnake-Mahl, A., So, M., & Subramanian, S. V. (2016). Research on neighborhood effects on health in the United States: a systematic review of study characteristics. *Social Science & Medicine*, 168, 16-29. <https://doi.org/10.1016/j.socscimed.2016.08.047>
- Aresi, G., & Pedersen, E. R. (2016). 'That right level of intoxication': A Grounded Theory study on young adults' drinking in nightlife settings. *Journal of Youth Studies*, 19(2), 204-220. <https://doi.org/10.1080/13676261.2015.1059931>
- Ashiabi, G. S., & O'Neal, K. K. (2015). Child social development in context: An examination of some propositions in Bronfenbrenner's bioecological theory. *Sage Open*, 5(2). <https://doi.org/10.1177/2158244015590840>
- Asparouhov, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: Three-step approaches using Mplus. *Structural Equation Modeling*, 21(3), 329–341. <https://doi.org/10.1080/10705511.2014.915181>
- Atkinson, A. M., & Sumnall, H. R. (2016). 'If I don't look good, it just doesn't go up': A qualitative study of young women's drinking cultures and practices on Social Network Sites. *International Journal of Drug Policy*, 38, 50-62. <https://doi.org/10.1016/j.drugpo.2016.10.019>
- Atkinson, A. M., Meadows, B. R., Emslie, C., Lyons, A., & Sumnall, H. R. (2022). 'Pretty in Pink' and 'Girl Power': an analysis of the targeting and representation of women in alcohol brand marketing on Facebook and Instagram. *International Journal of Drug Policy*, 101, 103547. <https://doi.org/10.1016/j.drugpo.2021.103547>
- Atkinson, A. M., Meadows, B. R., Nicholls, E., & Sumnall, H. (2023). 'Some days I am a lunatic that thinks I can moderate': Amalgamating recovery and neo-liberal discourses within accounts of non-drinking among women active in the 'positive sobriety' community on Instagram in the UK. *International Journal of Drug Policy*, 112, 103937. <https://doi.org/10.1016/j.drugpo.2022.103937>
- Auchincloss, A. H., & Diez Roux, A. V. (2008). A new tool for epidemiology: the usefulness of dynamic-agent models in understanding place effects on health. *American Journal of Epidemiology*, 168(1), 1-8. <https://doi.org/10.1093/aje/kwn118>

- Babor, T. F., & Caetano, R. (2006). Subtypes of substance dependence and abuse: implications for diagnostic classification and empirical research. *Addiction*, 101, 104-110. <https://doi.org/10.1111/j.1360-0443.2006.01595.x>
- Babor, T. F., & Robaina, K. (2016). The Alcohol Use Disorders Identification Test (AUDIT): A review of graded severity algorithms and national adaptations. <https://doi.org/10.7895/ijadr.v5i2.222>
- Babor, T. F., Del Boca, F., & Bray, J. W. (2017). Screening, brief intervention and referral to treatment: implications of SAMHSA's SBIRT initiative for substance abuse policy and practice. *Addiction*, 112, 110-117. <http://doi.org/10.1111/add.13675>
- Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *AUDIT: The Alcohol Use Disorders Identification Test (AUDIT): Guidelines for use in primary care*. Geneva, Switzerland: Department of Mental Health and Substance Dependence, World Health Organization. Available at: https://iris.who.int/bitstream/handle/10665/67205/WHO_MS?sequence=1 (Accessed 12 June 2024)
- Babor, T. F., Hofmann, M., DelBoca, F. K., Hesselbrock, V., Meyer, R. E., Dolinsky, Z. S., & Rounsaville, B. (1992). Types of alcoholics, I: Evidence for an empirically derived typology based on indicators of vulnerability and severity. *Archives of General Psychiatry*, 49(8), 599-608. <https://doi.org/10.1001/archpsyc.1992.01820080007002>
- Baffoe, G. (2019). Understanding the neighbourhood concept and its evolution: A review. *Environment and Urbanization ASIA*, 10(2), 393-402. <https://doi.org/10.1177/097542531985911>
- Bahl, N. K. H., Nafstad, H. E., Blakar, R. M., Landheim, A. S., & Brodahl, M. (2019). Multiple senses of community and recovery processes. A pilot study for a national evaluation of the experiences of persons with substance use problems receiving help and services from Norwegian municipalities. *Journal of Community Psychology*, 47(6), 1399-1418. <https://doi.org/https://doi.org/10.1002/jcop.22194>
- Bahl, N. K. H., Oversveen, E., Brodahl, M., Nafstad, H. E., Blakar, R. M., Landheim, A. S., & Tømmervik, K. (2023). Multiple psychological senses of community and community influences on personal recovery processes from substance use problems in later life: a collaborative and deductive reflexive thematic analysis [Article]. *International Journal of Qualitative Studies on Health and Well-being*, 18(1), 27, Article 2190200. <https://doi.org/10.1080/17482631.2023.2190200>
- Baker, C. (2020, January 23). *Mental health statistics for England: prevalence, services and funding* (House of Commons Library Briefing Paper. Number 6988). House of Commons Library. Available at: <https://commonslibrary.parliament.uk/research-briefings/sn06988/> (Accessed 9 July 2021)
- Bamford, J., Klabbers, G., Curran, E., Rosato, M., & Leavey, G. (2021). Social capital and mental health among black and minority ethnic groups in the UK. *Journal of Immigrant and Minority Health*, 23, 502-510. <https://doi.org/10.1007/s10903-020-01043-0>
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52(1), 1-26. <https://doi.org/10.1146/annurev.psych.52.1.1>
- Bandura, A., & Walters, R. H. (1977). *Social learning theory* (Vol. 1, pp. 141-154). Englewood Cliffs, NJ: Prentice hall.
- Banks, S., Armstrong, A., Carter, K., Graham, H., Hayward, P., Henry, A., Holland, T., Holmes, C., Lee, A., McNulty, A., Moore, N., Nayling, N., Stokoe, A., & Strachan, A. (2013). Everyday ethics in community-based participatory research. *Contemporary Social Science*, 8(3), 263-277. <https://doi.org/10.1080/21582041.2013.769618>
- Banks, M. H., Clegg, C. W., Jackson, P. R., Kemp, N. J., Stafford, E. M., & Wall, T. D. (1980). The use of the General Health Questionnaire as an indicator of mental health in occupational studies. *Journal of Occupational Psychology*, 53(3), 187-194. <https://doi.org/10.1111/j.2044-8325.1980.tb00024.x>
- Baranyi, G., Sieber, S., Cullati, S., Pearce, J. R., Dibben, C. J., & Courvoisier, D. S. (2020). The longitudinal associations of perceived neighborhood disorder and lack of social cohesion with depression among adults aged 50 years or older: An individual-

- participant-data meta-analysis from 16 high-income countries. *American Journal of Epidemiology*, 189(4), 343-353. <https://doi.org/10.1093/aje/kwz209>
- Barbiero, G., & Berto, R. (2021). Biophilia as evolutionary adaptation: An onto-and phylogenetic framework for biophilic design. *Frontiers in Psychology*, 12, 700709. <https://doi.org/10.3389/fpsyg.2021.700709>
- Barr, P. B. (2018). Neighborhood conditions and trajectories of alcohol use and misuse across the early life course [Article]. *Health & Place*, 51, 36-44. <https://doi.org/10.1016/j.healthplace.2018.02.007>
- Bartram, A., Elliott, J., & Crabb, S. (2017). 'Why can't I just not drink?' A qualitative study of adults' social experiences of stopping or reducing alcohol consumption. *Drug and Alcohol Review*, 36(4), 449-455. <https://doi.org/10.1111/dar.12461>
- Bashir, N., & Flint, J. (2010). Residents' perceptions of neighbourhood change and its impacts. Sheffield: Centre for Regional Economic and Social Research Sheffield Hallam University. Available at: https://research.shu.ac.uk/cresr/living-through-change/documents/RP2_NeighbourhoodChange.pdf (Accessed 18 July 2024)
- Bassett, E., & Moore, S. (2013). Gender differences in the social pathways linking neighborhood disadvantage to depressive symptoms in adults. *PloS one*, 8(10), e76554. <https://doi.org/10.1371/journal.pone.0076554>
- Bates, E. A., McCann, J. J., Kaye, L. K., & Taylor, J. C. (2017). "Beyond words": a researcher's guide to using photo elicitation in psychology. *Qualitative Research in Psychology*, 14(4), 459-481. <https://doi.org/10.1080/14780887.2017.1359352>
- Baxter, S., Killoran, A., Kelly, M. P., & Goyder, E. (2010). Synthesizing diverse evidence: the use of primary qualitative data analysis methods and logic models in public health reviews. *Public Health*, 124(2), 99-106. <https://doi.org/10.1016/j.puhe.2010.01.002>
- Beard, E., Brown, J., West, R., Angus, C., Brennan, A., Holmes, J., ... & Michie, S. (2016). Deconstructing the alcohol harm paradox: a population based survey of adults in England. *PloS one*, 11(9), e0160666. <https://doi.org/10.1371/journal.pone.0160666>
- Beauvais, C., & Jenson, J. (2002). *Social cohesion: Updating the state of the research* (Vol. 62). Ottawa: CPRN. Available at: https://oaresource.library.carleton.ca/cprn/12949_en.pdf (Accessed 18 July 2024)
- Bécares, L., Dewey, M. E., & Das-Munshi, J. (2018). Ethnic density effects for adult mental health: systematic review and meta-analysis of international studies. *Psychological Medicine*, 48(12), 2054-2072. <https://doi.org/10.1017/s0033291717003580>
- Bécares, L., Nazroo, J., & Stafford, M. (2011). The ethnic density effect on alcohol use among ethnic minority people in the UK. *Journal of Epidemiology & Community Health*, 65(1), 20-25. <https://doi.org/10.1136/jech.2009.087114>
- Beenstock, J., Adams, J., & White, M. (2011). The association between time perspective and alcohol consumption in university students: cross-sectional study. *The European Journal of Public Health*, 21(4), 438-443. <https://doi.org/10.1093/eurpub/ckp225>
- Bell, S., & Britton, A. (2014). An exploration of the dynamic longitudinal relationship between mental health and alcohol consumption: a prospective cohort study. *BMC Medicine*, 12, 1-13. <https://doi.org/10.1186/1741-7015-12-91>
- Bell, S., Butler, M., & Lawther, C. (2021). Desistance in context: Understanding the effects of subculture on the desistance process during reintegration. *British Journal of Criminology*, 61(3), 812-831. <https://doi.org/10.1093/bjc/azaa097>
- Bellis, M. A., Hughes, K., Nicholls, J., Sheron, N., Gilmore, I., & Jones, L. (2016). The alcohol harm paradox: using a national survey to explore how alcohol may disproportionately impact health in deprived individuals. *BMC Public Health*, 16, 1-10. <https://doi.org/10.1186/s12889-016-2766-x>
- Bennett, D. A. (2001). How can I deal with missing data in my study?. *Australian and New Zealand Journal of Public Health*, 25(5), 464-469. <https://doi.org/10.1111/j.1467-842X.2001.tb00294.x>
- Bennett, J. E., Pearson-Stuttard, J., Kontis, V., Capewell, S., Wolfe, I., & Ezzati, M. (2018). Contributions of diseases and injuries to widening life expectancy inequalities in

- England from 2001 to 2016: a population-based analysis of vital registration data. *The Lancet Public Health*, 3(12), e586-e597. [https://doi.org/10.1016/S2468-2667\(18\)30214-7](https://doi.org/10.1016/S2468-2667(18)30214-7)
- Berlin, K. S., Williams, N. A., & Parra, G. R. (2014). An introduction to latent variable mixture modeling (part 1): Overview and cross-sectional latent class and latent profile analyses. *Journal of Pediatric Psychology*, 39(2), 174-187. <https://doi.org/10.1093/jpepsy/jst084>
- Berry, H. L., & Welsh, J. A. (2010). Social capital and health in Australia: an overview from the household, income and labour dynamics in Australia survey. *Social Science & Medicine*, 70(4), 588-596. <https://doi.org/10.1016/j.socscimed.2009.10.012>
- Bertossi Urzua, C., Ruiz, M. A., Pajak, A., Kozela, M., Kubinova, R., Malyutina, S., ... & Bobak, M. (2019). The prospective relationship between social cohesion and depressive symptoms among older adults from Central and Eastern Europe. *J Epidemiol Community Health*, 73(2), 117-122. <https://doi.org/10.1136/jech-2018-211063>
- Bertotti, M., Watts, P., Netuveli, G., Yu, G., Schmidt, E., Tobi, P., ... & Renton, A. (2013). Types of social capital and mental disorder in deprived urban areas: a multilevel study of 40 disadvantaged London neighbourhoods. *PLoS One*, 8(12), e80127. <https://doi.org/10.1371/journal.pone.0080127>
- Beseler, C. L., Taylor, L. A., Kraemer, D. T., & Leeman, R. F. (2012). A latent class analysis of DSM-IV alcohol use disorder criteria and binge drinking in undergraduates. *Alcoholism: Clinical and Experimental Research*, 36(1), 153-161. <https://doi.org/10.1111/j.1530-0277.2011.01595.x>
- Best, D. W., & Lubman, D. I. (2012). The recovery paradigm: A model of hope and change for alcohol and drug addiction. *Australian Family Physician*, 41(8), 593-597.
- Best, D. W., Byrne, G., Pullen, D., Kelly, J., Elliot, K., & Savic, M. (2014). Therapeutic communities and the local community: Isolation or integration? *Therapeutic Communities*, 35(4), 150-158. <https://doi.org/https://doi.org/10.1108/TC-07-2014-0024>
- Best, D., & Colman, C. (2019). Let's celebrate recovery. Inclusive Cities working together to support social cohesion [Article]. *Addiction Research & Theory*, 27(1), 55-64. <https://doi.org/10.1080/16066359.2018.1520223>
- Best, D., & de Alwis, S. (2017). Community recovery as a public health intervention: The contagion of hope. *Alcoholism Treatment Quarterly*, 35(3), 187-199. <https://doi.org/10.1080/07347324.2017.1318647>
- Best, D., & Ivers, J. H. (2022). Inkspots and ice cream cones: a model of recovery contagion and growth [Review]. *Addiction Research & Theory*, 30(3), 155-161. <https://doi.org/10.1080/16066359.2021.1986699>
- Best, D., & Laudet, A. (2010). The potential of recovery capital. *London: RSA*.
- Beyer, K. M., Kaltenbach, A., Szabo, A., Bogar, S., Nieto, F. J., & Malecki, K. M. (2014). Exposure to neighborhood green space and mental health: evidence from the survey of the health of Wisconsin. *International Journal of Environmental Research and Public Health*, 11(3), 3453-3472. <https://doi.org/10.3390/ijerph110303453>
- Bhalla, I. P., & Rosenheck, R. A. (2018). A change in perspective: from dual diagnosis to multimorbidity. *Psychiatric Services*, 69(1), 112-116. <https://doi.org/10.1176/appi.ps.201700194>
- Biesta G. (2010). Pragmatism and the philosophical foundations of mixed methods research. In A. Tashakkori, A & C. Teddlie (Eds.), *Handbook of mixed methods in social & behavioral research* (2nd ed., pp. 95–118). Thousand Oaks, CA: Sage.
- Bischof, G., Rumpf, H. J., Meyer, C., Hapke, U., & John, U. (2007). Stability of subtypes of natural recovery from alcohol dependence after two years. *Addiction*, 102(6), 904-908. <https://doi.org/10.1111/j.1360-0443.2007.01834.x>
- Björklund, O., Söderlund, M., Nyström, L., & Häggström, E. (2015). Unemployment and health: experiences narrated by young Finnish men. *American Journal of Men's Health*, 9(1), 76-85. <https://doi.org/10.1177/155798831453672>

- Bjornstrom, E. E., Ralston, M. L., & Kuhl, D. C. (2013). Social cohesion and self-rated health: the moderating effect of neighborhood physical disorder. *American Journal of Community Psychology*, 52, 302-312. <https://doi.org/10.1007/s10464-013-9595-1>
- Blanchard, A., & Horan, T. (2000). Virtual communities and social capital. In *Social dimensions of information technology: Issues for the new millennium* (pp. 6-22). IGI Global. <https://doi.org/10.4018/978-1-878289-86-5.ch001>
- Bolton, J. M., Robinson, J., & Sareen, J. (2009). Self-medication of mood disorders with alcohol and drugs in the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of Affective Disorders*, 115(3), 367-375. <https://doi.org/10.1016/j.jad.2008.10.003>
- Bond, J. C., Roberts, S. C., Greenfield, T. K., Korcha, R., Ye, Y., & Nayak, M. B. (2010). Gender differences in public and private drinking contexts: a multi-level GENACIS analysis. *International Journal of Environmental Research and Public Health*, 7(5), 2136-2160. <https://doi.org/10.3390/ijerph7052136>
- Bond, L., Kearns, A., Mason, P., Tannahill, C., Egan, M., & Whitely, E. (2012). Exploring the relationships between housing, neighbourhoods and mental wellbeing for residents of deprived areas. *BMC Public Health*, 12, 1-14. <https://doi.org/10.1186/1471-2458-12-48>
- Bonell, C. P., Fletcher, A., Jamal, F., Wells, H., Harden, A., Murphy, S., & Thomas, J. (2013). Theories of how the school environment impacts on student health: Systematic review and synthesis. *Health & Place*, 24, 242-249. <https://doi.org/10.1016/j.healthplace.2013.09.014>
- Bonevski, B., Randell, M., Paul, C., Chapman, K., Twyman, L., Bryant, J., ... & Hughes, C. (2014). Reaching the hard-to-reach: a systematic review of strategies for improving health and medical research with socially disadvantaged groups. *BMC Medical Research Methodology*, 14, 1-29. <https://doi.org/10.1186/1471-2288-14-42>
- Bonomi Bezzo, F., Silva, L., & Van Ham, M. (2021). The combined effect of Covid-19 and neighbourhood deprivation on two dimensions of subjective well-being: Empirical evidence from England. *PLoS One*, 16(7), e0255156. <https://doi.org/10.1371/journal.pone.0255156>
- Booth, A., & Carroll, C. (2015). Systematic searching for theory to inform systematic reviews: is it feasible? Is it desirable?. *Health Information & Libraries Journal*, 32(3), 220-235. <https://doi.org/10.1111/hir.12108>
- Borgonovi, F. (2010). A life-cycle approach to the analysis of the relationship between social capital and health in Britain. *Social Science & Medicine*, 71(11), 1927-1934. <https://doi.org/10.1016/j.socscimed.2010.09.018>
- Borkowska, M., & Laurence, J. (2021). Coming together or coming apart? Changes in social cohesion during the Covid-19 pandemic in England. *European Societies*, 23(S1), S618-S636. <https://doi.org/10.1080/14616696.2020.1833067>
- Borkowska, M. (2019) *Improving Population and Sub-group Coverage: Who Is Missing and What Can Be Done About It?*, Understanding Society, Colchester: University of Essex, Working Paper no. 2019-15. Available at: <https://www.understandingsociety.ac.uk/sites/default/files/downloads/working-papers/2019-15.pdf> (Accessed 12 July 2024)
- Bornoli, A., Parkhurst, G., & Morgan, P. L. (2018). The psychological wellbeing benefits of place engagement during walking in urban environments: A qualitative photo-elicitation study. *Health & Place*, 53, 228-236. <https://doi.org/10.1016/j.healthplace.2018.08.018>
- Bosque-Prous, M., Espelt, A., Guitart, A. M., Bartroli, M., Villalbí, J. R., & Brugal, M. T. (2014). Association between stricter alcohol advertising regulations and lower hazardous drinking across European countries. *Addiction*, 109(10), 1634-1643. <https://doi.org/10.1111/add.12562>
- Boucher, L. M., Marshall, Z., Martin, A., Larose-Hébert, K., Flynn, J. V., Lalonde, C., Pineau, D., Bigelow, J., Rose, T., Chase, R., Boyd, R., Tyndall, M., & Kendall, C. (2017). Expanding conceptualizations of harm reduction: results from a qualitative community-based participatory research study with people who inject drugs [Article].

Harm Reduction Journal, 14, 18, Article 18. <https://doi.org/10.1186/s12954-017-0145-2>

- Bourdieu, P. (1986). The forms of capital. In J. G. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241-258). Greenwood Press.
- Boyd, J., Sexton, O., Angus, C., Meier, P., Purshouse, R. C., & Holmes, J. (2022). Causal mechanisms proposed for the alcohol harm paradox—a systematic review. *Addiction*, 117(1), 33-56. <https://doi.org/10.1111/add.15567>
- Bradizza, C. M., Stasiewicz, P. R., & Paas, N. D. (2006). Relapse to alcohol and drug use among individuals diagnosed with co-occurring mental health and substance use disorders: a review. *Clinical Psychology Review*, 26(2), 162-178. <https://doi.org/10.1016/j.cpr.2005.11.005>
- Bradley, K. A., DeBenedetti, A. F., Volk, R. J., Williams, E. C., Frank, D., & Kivlahan, D. R. (2007). AUDIT-C as a brief screen for alcohol misuse in primary care. *Alcoholism: Clinical and Experimental Research*, 31(7), 1208-1217. <https://doi.org/10.1111/j.1530-0277.2007.00403.x>
- Bräker, A. B., & Soellner, R. (2017). Is drinking contagious? An analysis of the collectivity of drinking behavior theory within a multilevel framework. *Alcohol and Alcoholism*, 52(6), 692-698. <https://doi.org/10.1093/alcac/agx050>
- Brauer, M., Roth, G. A., Aravkin, A. Y., Zheng, P., Abate, K. H., Abate, Y. H., ... & Amani, R. (2024). Global burden and strength of evidence for 88 risk factors in 204 countries and 811 subnational locations, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021. *The Lancet*, 403(10440), 2162-2203. [https://doi.org/10.1016/S0140-6736\(24\)00933-4](https://doi.org/10.1016/S0140-6736(24)00933-4)
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <https://doi.org/10.1191/1478088706qp063oa>
- Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, 11(4), 589-597. <https://doi.org/10.1080/2159676X.2019.1628806>
- Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide*. SAGE Publications.
- Braveman, P., & Gottlieb, L. (2014). The social determinants of health: it's time to consider the causes of the causes. *Public Health Reports*, 129(Suppl 2), 19-31. <https://doi.org/10.1177/00333549141291S20>
- Bravo, A. J., Kelley, M. L., & Hollis, B. F. (2016). Social support, depressive symptoms, and hazardous alcohol use among Navy members: An examination of social support as a protective factor across deployment. *Journal of Social and Clinical Psychology*, 35(8), 693-704. <https://doi.org/10.1521/jscp.2016.35.8.693>
- Breedvelt, J. J., Tiemeier, H., Sharples, E., Galea, S., Niedzwiedz, C., Elliott, I., & Bockting, C. L. (2022). The effects of neighbourhood social cohesion on preventing depression and anxiety among adolescents and young adults: rapid review. *BJPsych open*, 8(4), e97. <https://doi.org/10.1192/bjo.2022.57>
- Brennan, A., Meng, Y., Holmes, J., Hill-McManus, D., & Meier, P. S. (2014). Potential benefits of minimum unit pricing for alcohol versus a ban on below cost selling in England 2014: modelling study. *BMJ*, 349. <https://doi.org/10.1136/bmj.g5452>
- Brenner, A. B., Bauermeister, J. A., & Zimmerman, M. A. (2011). Neighborhood variation in adolescent alcohol use: Examination of socioecological and social disorganization theories. *Journal of Studies on Alcohol and Drugs*, 72(4), 651-659. <https://doi.org/10.15288/jsad.2011.72.651>
- Bresin, K., & Mekawi, Y. (2021). The “why” of drinking matters: A meta-analysis of the association between drinking motives and drinking outcomes. *Alcoholism: Clinical and Experimental Research*, 45(1), 38-50. <https://doi.org/10.1111/acer.14518>
- Brewer, C. (2020, January). *Indices of deprivation (2019) – Sefton summary*. Available at: <https://modgov.sefton.gov.uk/documents/s111915/Enc.%201%20for%20Cost%20Of%20Living%20Crisis.pdf> (Accessed 12 June 2024)
- Brierley-Jones, L., Ling, J., McCabe, K. E., Wilson, G. B., Crosland, A., Kaner, E. F., & Houghton, C. A. (2014). Habitus of home and traditional drinking: a qualitative analysis

- of reported middle-class alcohol use. *Sociology of Health & Illness*, 36(7), 1054-1076. <https://doi.org/10.1111/1467-9566.12145>
- Brisson, D., Lopez, A., & Yoder, J. (2014). Neighborhoods and mental health trajectories of low-income mothers. *Journal of Community Psychology*, 42(5), 519-529. <https://doi.org/10.1002/jcop.21634>
- Britton, A., Ben-Shlomo, Y., Benzeval, M., Kuh, D., & Bell, S. (2015). Life course trajectories of alcohol consumption in the United Kingdom using longitudinal data from nine cohort studies. *BMC Medicine*, 13, 1-9. <https://doi.org/10.1186/s12916-015-0273-z>
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. *Developmental Psychology*, 22(6), 723-742. <https://doi.org/10.1037/0012-1649.22.6.723>
- Bronfenbrenner, U., & Morris, P. A. (2007). The bioecological model of human development. *Handbook of Child Psychology*, 1.
- Brookfield, S., Fitzgerald, L., Selvey, L., & Maher, L. (2019). Turning points, identity, and social capital: A meta-ethnography of methamphetamine recovery [Article]. *International Journal of Drug Policy*, 67, 79-90. <https://doi.org/10.1016/j.drugpo.2019.02.002>
- Brooks, A. T., Lòpez, M. M., Ranucci, A., Krumlauf, M., & Wallen, G. R. (2017). A qualitative exploration of social support during treatment for severe alcohol use disorder and recovery. *Addictive Behaviors Reports*, 6, 76-82. <https://doi.org/10.1016/j.abrep.2017.08.002>
- Brown, G., Marshall, M., Bower, P., Woodham, A., & Waheed, W. (2014). Barriers to recruiting ethnic minorities to mental health research: a systematic review. *International Journal of Methods in Psychiatric Research*, 23(1), 36-48. <https://doi.org/10.1002/mpr.1434>
- Bryden, A., Roberts, B., Petticrew, M., & McKee, M. (2013). A systematic review of the influence of community level social factors on alcohol use. *Health & Place*, 21, 70-85. <https://doi.org/10.1016/j.healthplace.2013.01.012>
- Buck, D., & Maguire, D. (2015). Inequalities in life expectancy. Changes over time and implications for policy. *London: The King's Fund*. Available at: <https://www.kingsfund.org.uk/insight-and-analysis/reports/inequalities-life-expectancy> (Accessed 12 June 2024)
- Buckner, J. C. (1988). The development of an instrument to measure neighborhood cohesion. *American Journal of Community Psychology*, 16(6), 771-791. <https://doi.org/10.1007/BF00930892>
- Burt, R. (1992). *Structural Holes: The Social Structure of Competition*. Cambridge, MA: Harvard University Press.
- Burton, R., Henn, C., Lavoie, D., O'Connor, R., Perkins, C., Sweeney, K., ... & Sheron, N. (2017). A rapid evidence review of the effectiveness and cost-effectiveness of alcohol control policies: an English perspective. *The Lancet*, 389(10078), 1558-1580. [https://doi.org/10.1016/S0140-6736\(16\)32420-5](https://doi.org/10.1016/S0140-6736(16)32420-5)
- Burzynska, B., & Stolarski, M. (2020). Rethinking the relationships between time perspectives and well-being: Four hypothetical models conceptualizing the dynamic interplay between temporal framing and mechanisms boosting mental well-being. *Frontiers in Psychology*, 11, Article 1033. <https://doi.org/10.3389/fpsyg.2020.01033>
- Buu, A., Mansour, M., Wang, J., Refior, S. K., Fitzgerald, H. E., & Zucker, R. A. (2007). Alcoholism effects on social migration and neighborhood effects on alcoholism over the course of 12 years. *Alcoholism: Clinical and Experimental Research*, 31(9), 1545-1551. <https://doi.org/10.1111/j.1530-0277.2007.00449.x>
- Buykx, P., Gilligan, C., Ward, B., Kippen, R., & Chapman, K. (2015). Public support for alcohol policies associated with knowledge of cancer risk. *International Journal of Drug Policy*, 26(4), 371-379. <https://doi.org/10.1016/j.drugpo.2014.08.006>
- Byrnes, H. F., Miller, B. A., Bourdeau, B., & Johnson, M. B. (2019). Impact of group cohesion among drinking groups at nightclubs on risk from alcohol and other drug use. *Journal of Drug Issues*, 49(4), 668-679. <https://doi.org/10.1177/0022042619859257>

- Caluzzi, G., Livingston, M., Holmes, J., MacLean, S., Lubman, D., Dietze, P., ... & Pennay, A. (2022). Declining drinking among adolescents: are we seeing a denormalisation of drinking and a normalisation of non-drinking?. *Addiction*, 117(5), 1204-1212. <https://doi.org/10.1111/add.15611>
- Cambron, C., Kosterman, R., Rhew, I. C., Catalano, R. F., Guttmanova, K., & Hawkins, J. D. (2017). An examination of alcohol use disorder symptoms and neighborhood disorganization from age 21 to 39. *American Journal of Community Psychology*, 60(1-2), 267-278. <https://doi.org/10.1002/ajcp.12160>
- Cameron, R. (2011). Mixed methods research: The five Ps framework. *Electronic Journal of Business Research Methods*, 9(2), 96-108.
- Campbell, C. (2004). I shop therefore I know that I am: The metaphysical foundations of modern consumerism. In: Ekstrom K, Brembeck H (eds) *Elusive Consumption* (pp. 27-44). Oxford: Berg.
- Campbell, J. M., & Oei, T. P. (2010). A cognitive model for the intergenerational transference of alcohol use behavior. *Addictive Behaviors*, 35(2), 73-83. <https://doi.org/10.1016/j.addbeh.2009.09.013>
- Canham, S. L., Mauro, P. M., Kaufmann, C. N., & Sixsmith, A. (2016). Association of alcohol use and loneliness frequency among middle-aged and older adult drinkers. *Journal of Aging and Health*, 28(2), 267-284. <https://doi.org/10.1177/0898264315589579>
- Cargo, M., & Mercer, S. L. (2008). The value and challenges of participatory research: strengthening its practice. *Annual Review of Public Health*, 29, 325-350. <https://doi.org/10.1146/annurev.publhealth.29.091307.083824>
- Carpiano, R. M. (2006). Toward a neighborhood resource-based theory of social capital for health: can Bourdieu and sociology help?. *Social Science & Medicine*, 62(1), 165-175. <https://doi.org/10.1016/j.socscimed.2005.05.020>
- Carrà, G., Bartoli, F., Brambilla, G., Crocamo, C., & Clerici, M. (2015). Comorbid addiction and major mental illness in Europe: a narrative review. *Substance abuse*, 36(1), 75-81. <https://doi.org/10.1080/08897077.2014.96055>
- Carrasco, M. A., & Bilal, U. (2016). A sign of the times: To have or to be? Social capital or social cohesion?. *Social Science & Medicine*, 159, 127-131. <https://doi.org/10.1016/j.socscimed.2016.05.012>
- Carrillo Álvarez, E., & Riera Romaní, J. (2017). Measuring social capital: further insights. *Gaceta Sanitaria*, 31, 57-61. <https://doi.org/10.1016/j.gaceta.2016.09.002>
- Carroll, C., Booth, A., & Cooper, K. (2011). A worked example of" best fit" framework synthesis: a systematic review of views concerning the taking of some potential chemopreventive agents. *BMC Medical Research Methodology*, 11, 1-9. <https://doi.org/10.1186/1471-2288-11-29>
- Carroll, C., Booth, A., Leaviss, J., & Rick, J. (2013). "Best fit" framework synthesis: refining the method. *BMC Medical Research Methodology*, 13, 1-16. <https://doi.org/10.1186/1471-2288-13-37>
- Casey, M., Adamson, G., & Stringer, M. (2013). Empirical derived AUD sub types in the US general population: A latent class analysis. *Addictive Behaviors*, 38(11), 2782-2786. <https://doi.org/10.1016/j.addbeh.2013.06.022>
- Catney, G., Frost, D., & Vaughn, L. (2019). Residents' perspectives on defining neighbourhood: Mental mapping as a tool for participatory neighbourhood research. *Qualitative Research*, 19(6), 735-752. <https://doi.org/10.1177/1468794118803841>
- CDC. (2018). Glossary – Alcohol. Available at: https://www.cdc.gov/nchs/nhis/alcohol/alcohol_glossary.htm#:~:text=Drinking%20status&text=Current%20infrequent%20drinker%20%E2%80%93%201%2D11,average%20over%20the%20past%20year. (Accessed 18 July 2024)
- Chaix, B., Leyland, A. H., Sabel, C. E., Chauvin, P., Råstam, L., Kristersson, H., & Merlo, J. (2006). Spatial clustering of mental disorders and associated characteristics of the neighbourhood context in Malmö, Sweden, in 2001. *Journal of Epidemiology & Community Health*, 60(5), 427-435. <https://doi.org/10.1136/jech.2005.040360>

- Chambers, S. E., Canvin, K., Baldwin, D. S., & Sinclair, J. M. (2017). Identity in recovery from problematic alcohol use: A qualitative study of online mutual aid. *Drug and Alcohol Dependence*, 174, 17-22. <https://doi.org/10.1016/j.drugalcdep.2017.01.009>
- Chan, J., To, H. P., & Chan, E. (2006). Reconsidering social cohesion: Developing a definition and analytical framework for empirical research. *Social Indicators Research*, 75, 273-302. <https://doi.org/10.1007/s11205-005-2118-1>
- Chandra, A., Cahill, M., Yeung, D., & Ross, R. (2018). Toward an initial conceptual framework to assess community allostatic load. *RAND Corporation*. Available at: https://www.rand.org/pubs/research_reports/RR2559.html
- Chase, A., Dykxhoorn, J., Hollander, A., Magnusson, C., Dalman, C., & Kirkbride, J. B. (2022). Longitudinal association between neighbourhood-level social capital and incidence of major psychiatric disorders: a cohort study of 1.4 m people in Stockholm County, Sweden. <https://doi.org/10.31234/osf.io/269rx>
- Chauhan, P., Ahern, J., Galea, S., & Keyes, K. M. (2016). Neighborhood Context and Binge Drinking by Race and Ethnicity in New York City. *Alcoholism: Clinical & Experimental Research*, 40(4), 785-793. <https://doi.org/10.1111/acer.13011>
- Chen, Y., Demnitz, N., Yamamoto, S., Yaffe, K., Lawlor, B., & Leroi, I. (2022). Defining brain health: a concept analysis. *International Journal of Geriatric Psychiatry*, 37(1). <https://doi.org/10.1002/gps.5564>
- Cheney, A. M., Booth, B. M., Borders, T. F., & Curran, G. M. (2016). The Role of Social Capital in African Americans' Attempts to Reduce and Quit Cocaine Use [Article]. *Substance Use & Misuse*, 51(6), 777-787. <https://doi.org/10.3109/10826084.2016.1155606>
- Child, S., Stewart, S., & Moore, S. (2017). Perceived control moderates the relationship between social capital and binge drinking: longitudinal findings from the Montreal Neighborhood Networks and Health Aging (MoNNET-HA) panel. *Annals of epidemiology*, 27(2), 128-134. <https://doi.org/10.1016/j.annepidem.2016.11.010>
- Chiu, C. M., Hsu, M. H., & Wang, E. T. (2006). Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. *Decision Support Systems*, 42(3), 1872-1888. <https://doi.org/10.1016/j.dss.2006.04.001>
- Cho, S. (2022). Theories explaining the relationship between neighbourhood stressors and depressive symptoms. *Humanities and Social Sciences Communications*, 9(1), 1-6. <https://doi.org/10.1057/s41599-021-01014-2>
- Choi, Y. J., & Matz-Costa, C. (2018). Perceived neighborhood safety, social cohesion, and psychological health of older adults. *The Gerontologist*, 58(1), 196-206. <https://doi.org/10.1093/geront/gnw187>
- Chuang, Y. C., & Chuang, K. Y. (2008). Gender differences in relationships between social capital and individual smoking and drinking behavior in Taiwan. *Social Science & Medicine*, 67(8), 1321-1330. <https://doi.org/10.1016/j.socscimed.2008.06.033>
- Chum, A., O'Campo, P., Lachaud, J., Fink, N., Kirst, M., & Nisenbaum, R. (2019). Evaluating same-source bias in the association between neighbourhood characteristics and depression in a community sample from Toronto, Canada. *Social Psychiatry and Psychiatric Epidemiology*, 54(10), 1177-1187. <https://doi.org/10.1007/s00127-019-01718-6>
- Claridge, T. (2018a). Dimensions of Social Capital – structural, cognitive, and relational. *Social Capital Research*, 1, 1-4.
- Claridge, T. (2018b). Functions of social capital—bonding, bridging, linking. *Social Capital Research*, 20(1), 1-7.
- Cloninger, C. R., Bohman, M., & Sigvardsson, S. (1981). Inheritance of alcohol abuse: Cross-fostering analysis of adopted men. *Archives of General Psychiatry*, 38(8), 861-868. <https://doi.org/10.1001/archpsyc.1981.01780330019001>
- Cockerham, W. C., Hamby, B. W., & Oates, G. R. (2017). The Social Determinants of Chronic Disease [Article]. *American Journal of Preventive Medicine*, 52(1), S5-S12. <https://doi.org/10.1016/j.amepre.2016.09.010>

- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillside, NJ: Lawrence Erlbaum Associates.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155-159. <https://doi.org/10.1037/0033-2909.112.1.155>
- Cohen-Cline, H., Turkheimer, E., & Duncan, G. E. (2015). Access to green space, physical activity and mental health: a twin study. *Journal of Epidemiology & Community Health*, 69(6), 523-529. <https://doi.org/10.1136/jech-2014-204667>
- Cole, E. R. (2009). Intersectionality and research in psychology. *American Psychologist*, 64(3), 170–180. <https://doi.org/10.1037/a0014564>
- Coleman, J. S. (1988a). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95-S120.
- Coleman, J. S. (1988b). Free riders and zealots: The role of social networks. *Sociological Theory*, 6(1), 52-57. <https://doi.org/10.2307/201913>
- Collin, J., & Casswell, S. (2016). Alcohol and the sustainable development goals. *Lancet*, 387, 2582–2583. [https://doi.org/10.1016/S0140-6736\(16\)30827-3](https://doi.org/10.1016/S0140-6736(16)30827-3)
- Committee of Advertising Practice. (2014). *The UK Code of Non-broadcast Advertising and Direct & Promotional Marketing*. Available at: <https://www.asa.org.uk/codes-and-rulings/advertising-codes/non-broadcast-code.html> (Accessed 18 July 2024)
- Compton, K. S., Barr, P., Karriker-Jaffe, K. J., Bares, C., Aliev, F., Mustanski, B., ... & Chartier, K. G. (2019). Evaluating neighborhood, social, and genetic influences on precursors of alcohol use risk behavior in African American adolescents. *International Journal of Environmental Research and Public Health*, 16(17), 3078. <https://doi.org/10.3390/ijerph16173078>
- Congdon, P. (2010). A multiple indicator, multiple cause method for representing social capital with an application to psychological distress. *Journal of Geographical Systems*, 12, 1-23. <https://doi.org/10.1007/s10109-009-0097-5>
- Conger, J. J. (1956). II. Reinforcement theory and the dynamics of alcoholism. *Quarterly Journal of Studies on Alcohol*, 17(2), 296-305. <https://doi.org/10.15288/qjsa.1956.17.296>
- Conner, K. R., Piquart, M., & Gamble, S. A. (2009). Meta-analysis of depression and substance use among individuals with alcohol use disorders. *Journal of Substance Abuse Treatment*, 37(2), 127-137. <https://doi.org/10.1016/j.jsat.2008.11.007>
- Cooper, M. L. (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment*, 6(2), 117.
- Corfe, S., Hyde, R. & Shepherd, J. (2020). Alcohol-free and low-strength drinks: Understanding their role in reducing alcohol-related harms. Social Market Foundation. Available at: <https://www.smf.co.uk/publications/no-low-alcohol-harms/> (Accessed 18 July 2024)
- Cornwall, A., & Jewkes, R. (1995). What is participatory research?. *Social Science & Medicine*, 41(12), 1667-1676. [https://doi.org/10.1016/0277-9536\(95\)00127-S](https://doi.org/10.1016/0277-9536(95)00127-S)
- Costera Meijer, I. (2013). When news hurts: The promise of participatory storytelling for urban problem neighbourhoods. *Journalism Studies*, 14(1), 13-28. <https://doi.org/10.1080/1461670X.2012.662398>
- Coulton, C. J., Korbin, J., Chan, T., & Su, M. (2001). Mapping residents' perceptions of neighborhood boundaries: A methodological note. *American Journal of Community Psychology*, 29(2), 371–383. <https://doi.org/10.1023/A:1010303419034>
- Cowley, J., Kiely, J., & Collins, D. (2016). Unravelling the Glasgow effect: The relationship between accumulative bio-psychosocial stress, stress reactivity and Scotland's health problems. *Preventive Medicine Reports*, 4, 370-375. <https://doi.org/10.1016/j.pmedr.2016.08.004>
- Cox, M. J., Stevens, A. K., Janssen, T., & Jackson, K. M. (2022). Event-level contextual predictors of high-intensity drinking events among young adults. *Drug and Alcohol Dependence*, 239, 109590. <https://doi.org/10.1016/j.drugalcdep.2022.109590>
- Cox, W. M., & Klinger, E. (1988). A motivational model of alcohol use. *Journal of Abnormal Psychology*, 97(2), 168–180. <https://doi.org/10.1037/0021-843X.97.2.168>

- Cranford, J. A., Krentzman, A. R., Mowbray, O., & Robinson, E. A. (2014). Trajectories of alcohol use over time among adults with alcohol dependence. *Addictive Behaviors*, 39(5), 1006-1011. <https://doi.org/10.1016/j.addbeh.2014.02.009>
- Crasta, D., Funk, J. L., Lee, S., & Rogge, R. D. (2018). Out Drinking the Joneses: Neighborhood Factors Moderating the Effects of Drinking on Relationship Quality over the First Four Years of Marriage [Article]. *Family Process*, 57(4), 960-978. <https://doi.org/10.1111/famp.12335>
- Creswell, J. W., & Plano Clark, V. L. (2011). Choosing a mixed methods design. In J. W. Creswell & V. L. Plano Clark (Eds.), *Designing and conducting mixed methods research* (pp. 53–106). Sage.
- Creswell, K. G. (2021). Drinking together and drinking alone: A social-contextual framework for examining risk for alcohol use disorder. *Current Directions in Psychological Science*, 30(1), 19-25. <https://doi.org/10.1177/0963721420969406>
- Cridland, E. K., Deane, F. P., Hsu, C. I., & Kelly, P. J. (2012). A comparison of treatment outcomes for individuals with substance use disorder alone and individuals with probable dual diagnosis. *International Journal of Mental Health and Addiction*, 10, 670-683. <https://doi.org/10.1007/s11469-011-9364-z>
- Cunningham, J. A., & McCambridge, J. (2012). Is alcohol dependence best viewed as a chronic relapsing disorder?. *Addiction*, 107(1), 6-12. <https://doi.org/10.1111/j.1360-0443.2011.03583.x>
- Daoud, N., Haque, N., Gao, M., Nisenbaum, R., Muntaner, C., & O'Campo, P. (2016). Neighborhood settings, types of social capital and depression among immigrants in Toronto. *Social Psychiatry and Psychiatric Epidemiology*, 51, 529-538. <https://doi.org/10.1007/s00127-016-1173-z>
- Darke, S. (2013). Pathways to heroin dependence: time to re-appraise self-medication. *Addiction*, 108(4), 659-667. <https://doi.org/10.1111/j.1360-0443.2012.04001.x>
- David, J., Visvalingam, S., & Norberg, M. M. (2021). Why did all the toilet paper disappear? Distinguishing between panic buying and hoarding during COVID-19. *Psychiatry Research*, 303, 114062. <https://doi.org/10.1016/j.psychres.2021.114062>
- Davies, E. L., Cooke, R., Maier, L. J., Winstock, A. R., & Ferris, J. A. (2021). Where and what you drink is linked to how much you drink: An exploratory survey of alcohol use in 17 countries. *Substance Use & Misuse*, 56(13), 1941-1950. <https://doi.org/10.1080/10826084.2021.1958864>
- Davis, A. K., & Rosenberg, H. (2013). Acceptance of non-abstinence goals by addiction professionals in the United States. *Psychology of Addictive Behaviors*, 27(4), 1102–1109. <https://doi.org/10.1037/a0030563>
- Davoren, M. P., Dahly, D., Shiely, F., & Perry, I. J. (2018). Alcohol consumption among university students: A latent class analysis. *Drugs: Education, Prevention and Policy*, 25(5), 422-430. <https://doi.org/10.1080/09687637.2017.1290787>
- Dawson, C. T., Wu, W., Fennie, K. P., Ibañez, G., Cano, M. Á., Pettit, J. W., & Trepka, M. J. (2019). Perceived neighborhood social cohesion moderates the relationship between neighborhood structural disadvantage and adolescent depressive symptoms. *Health & Place*, 56, 88-98. <https://doi.org/10.1016/j.healthplace.2019.01.001>
- Dawson, D. A., Goldstein, R. B., Moss, H. B., Li, T. K., & Grant, B. F. (2010). Gender differences in the relationship of internalizing and externalizing psychopathology to alcohol dependence: Likelihood, expression and course. *Drug and Alcohol Dependence*, 112(1-2), 9-17. <https://doi.org/10.1016/j.drugalcdep.2010.04.019>
- de Gaetano, G., & Costanzo, S. (2017). Alcohol and health: Praise of the J curves. *Journal of the American College of Cardiology*, 70(8), 923-925. <https://doi.org/10.1016/j.jacc.2017.07.710>
- de Gelder, R., Koster, E. M., van Buren, L. P., van Ameijden, E. J., Harrison, A., Birt, C. A., & Verma, A. (2017). Differences in adults' health and health behaviour between 16 European urban areas and the associations with socio-economic status and physical

- and social environment. *The European Journal of Public Health*, 27(suppl_2), 93-99. <https://doi.org/10.1093/eurpub/ckv141>
- de Meneses-Gaya, C., Zuardi, A. W., Loureiro, S. R., & Crippa, J. A. S. (2009). Alcohol Use Disorders Identification Test (AUDIT): An updated systematic review of psychometric properties. *Psychology & Neuroscience*, 2(1), 83-97. <https://doi.org/10.3922/j.psns.2009.1.12>
- De Silva, M. J., McKenzie, K., Harpham, T., & Huttly, S. R. (2005). Social capital and mental illness: a systematic review. *Journal of Epidemiology & Community Health*, 59(8), 619-627. <https://doi.org/10.1136/jech.2004.029678>
- de Visser, R. O., Robinson, E., & Bond, R. (2016). Voluntary temporary abstinence from alcohol during "Dry January" and subsequent alcohol use. *Health Psychology*, 35(3), 281. <https://doi.org/10.1037/hea0000297>
- Department for Levelling Up, Housing & Communities. (2023, July 13). *English Housing Survey 2021 to 2022: household moves - fact sheet*. Available at: <https://www.gov.uk/government/statistics/english-housing-survey-2021-to-2022-household-moves-fact-sheet/english-housing-survey-2021-to-2022-household-moves-fact-sheet> (Accessed 12 June 2024)
- Department for Levelling Up, Housing and Communities. (2022, February 2). Levelling up: Levelling up the United Kingdom executive summary. Available at: <https://www.gov.uk/government/publications/levelling-up-the-united-kingdom> (Accessed 18 July 2024)
- Department of Health. (2016). UK Chief Medical Officers' low risk drinking guidelines. Available at: https://assets.publishing.service.gov.uk/media/5a80b7ed40f0b623026951db/UK_CM_Os_report.pdf (Accessed 12 June 2024)
- Dhalla, S., & Kopeck, J. A. (2007). The CAGE questionnaire for alcohol misuse: a review of reliability and validity studies. *Clinical and Investigative Medicine*, 30(1), 33-41. <https://doi.org/10.25011/cim.v30i1.447>
- Di Castelnuovo, A., Costanzo, S., Bagnardi, V., Donati, M. B., Iacoviello, L., & de Gaetano, G. (2006). Alcohol dosing and total mortality in men and women: an updated meta-analysis of 34 prospective studies. *Archives of Internal Medicine*, 166(22), 2437-2445. <https://doi.org/10.1001/archinte.166.22.2437>
- Di Florio, A., Craddock, N., & Van den Bree, M. (2014). Alcohol misuse in bipolar disorder. A systematic review and meta-analysis of comorbidity rates. *European Psychiatry*, 29(3), 117-124. <https://doi.org/10.1016/j.eurpsy.2013.07.004>
- DiClemente, C. C., Corno, C. M., Graydon, M. M., Wiprovnick, A. E., & Knoblach, D. J. (2017). Motivational interviewing, enhancement, and brief interventions over the last decade: A review of reviews of efficacy and effectiveness. *Psychology of Addictive Behaviors*, 31(8), 862. <https://doi.org/10.1037/adb0000318>
- Diez Roux, A. V. (2001). Investigating neighborhood and area effects on health. *American Journal of Public Health*, 91(11), 1783-1789. <https://doi.org/10.2105/ajph.91.11.1783>
- Diez Roux, A. V., & Mair, C. (2010). Neighborhoods and health. *Annals of the New York Academy of Sciences*, 1186(1), 125-145. <https://doi.org/10.1111/j.1749-6632.2009.05333.x>
- Ding, N., Berry, H. L., & O'Brien, L. V. (2015). One-year reciprocal relationship between community participation and mental wellbeing in Australia: A panel analysis. *Social Science & Medicine*, 128, 246-254. <https://doi.org/10.1016/j.socscimed.2015.01.022>
- Domènech-Abella, J., Switsers, L., Mundó, J., Dierckx, E., Dury, S., & De Donder, L. (2021). The association between perceived social and physical environment and mental health among older adults: mediating effects of loneliness. *Aging & Mental Health*, 25(5), 962-968. <https://doi.org/10.1080/13607863.2020.1727853>
- Dong, Y., & Peng, C. Y. J. (2013). Principled missing data methods for researchers. *SpringerPlus*, 2, 1-17. <https://doi.org/10.1186/2193-1801-2-222>
- Donnelly, L., McLanahan, S., Brooks-Gunn, J., Garfinkel, I., Wagner, B. G., Jacobsen, W. C., ... & Gaydos, L. (2016). Cohesive neighborhoods where social expectations are

- shared may have positive impact on adolescent mental health. *Health Affairs*, 35(11), 2083-2091.
- Dora, J., Piccirillo, M., Foster, K. T., Arbeau, K., Armeli, S., Auriacombe, M., ... & King, K. M. (2023). The daily association between affect and alcohol use: A meta-analysis of individual participant data. *Psychological Bulletin*, 149(1-2), 1. <https://doi.org/10.1037/bul0000387>
- Douglass, C. H., Win, T. M., Goutzamanis, S., Lim, M. S., Block, K., Onsando, G., ... & Horyniak, D. (2023). Stigma associated with alcohol and other drug use among people from migrant and ethnic minority groups: Results from a systematic review of qualitative studies. *Journal of Immigrant and Minority Health*, 25(6), 1402-1425. <https://doi.org/10.1007/s10903-023-01468-3>
- Dowdall, N., Ward, C. L., & Lund, C. (2017). The association between neighbourhood-level deprivation and depression: evidence from the south african national income dynamics study. *BMC Psychiatry*, 17, 1-10. <https://doi.org/10.1186/s12888-017-1561-2>
- Doyle, L., Brady, A. M., & Byrne, G. (2009). An overview of mixed methods research. *Journal of Research in Nursing*, 14(2), 175-185. <https://doi.org/10.1177/1744987108093962>
- Doyle, L., Brady, A. M., & Byrne, G. (2016). An overview of mixed methods research—revisited. *Journal of Research in Nursing*, 21(8), 623-635. <https://doi.org/10.1177/1744987116674257>
- Ducharme, J. & Wolfson, E. (2019, June). Your zip code might determine how long you live – and the difference could be decades. *TIME*. Available at: <https://time.com/5608268/zip-code-health/> (Accessed 12 June 2024)
- Dumbili, E. W. (2015). 'What a man can do, a woman can do better': gendered alcohol consumption and (de) construction of social identity among young Nigerians. *BMC Public Health*, 15, 1-12. <https://doi.org/10.1186/s12889-015-1499-6>
- Duncan, S. C., Duncan, T. E., & Strycker, L. A. (2000). Risk and protective factors influencing adolescent problem behavior: A multivariate latent growth curve analysis. *Annals of Behavioral Medicine*, 22(2), 103-109. <https://doi.org/10.1007/BF02895772>
- Dupuis, M., Studer, J., Henchoz, Y., Deline, S., Baggio, S., N'Goran, A., ... & Gmel, G. (2016). Validation of French and German versions of a Perceived Neighborhood Social Cohesion Questionnaire among young Swiss males, and its relationship with substance use. *Journal of Health Psychology*, 21(2), 171-182. <https://doi.org/10.1177/1359105314524010>
- Durkheim, E. (1897). [Suicide: A Study in Sociology]. *Le suicide: étude de sociologie*. Paris, France: F. Alcan.
- Dzhambov, A. M., Markevych, I., Hartig, T., Tilov, B., Arabadzhiev, Z., Stoyanov, D., ... & Dimitrova, D. D. (2018). Multiple pathways link urban green-and bluespace to mental health in young adults. *Environmental Research*, 166, 223-233. <https://doi.org/10.1016/j.envres.2018.06.004>
- Eastwood, J. G., Jalaludin, B. B., & Kemp, L. A. (2014). Realist explanatory theory building method for social epidemiology: a protocol for a mixed method multilevel study of neighbourhood context and postnatal depression. *SpringerPlus*, 3, 1-12. <https://doi.org/10.1186/2193-1801-3-12>
- Echeverría, S., Diez-Roux, A. V., Shea, S., Borrell, L. N., & Jackson, S. (2008). Associations of neighborhood problems and neighborhood social cohesion with mental health and health behaviors: the Multi-Ethnic Study of Atherosclerosis. *Health & Place*, 14(4), 853-865. <https://doi.org/10.1016/j.healthplace.2008.01.004>
- Ehsan, A. M., & De Silva, M. J. (2015). Social capital and common mental disorder: a systematic review. *Journal of Epidemiology & Community Health*, 69(10), 1021-1028. <https://doi.org/10.1136/jech-2015-205868>
- Ehsan, A., Klaas, H. S., Bastianen, A., & Spini, D. (2019). Social capital and health: A systematic review of systematic reviews. *SSM-Population Health*, 8, 100425. <https://doi.org/10.1016/j.ssmph.2019.100425>

- Ellis, A. J., Briggs, D., Winlow, S., Silva Esquinas, A., Cordero Verdugo, R., & Ramiro Perez Suarez, J. (2018). Liberalism, lack and living the dream: re-considering youth, consumer sovereignty and the attractions of night-time leisure in Magaluf. *Journal of Extreme Anthropology*, 2(2). <http://dx.doi.org/10.5617/jea.6446>
- Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling*, 8(3), 430-457. https://doi.org/10.1207/S15328007SEM0803_5
- Eng, P. (2020). Theorizing a more radical approach to addiction through the lens of participatory spirituality [Article]. *Addiction Research & Theory*, 28(1), 12-20. <https://doi.org/10.1080/16066359.2019.1571190>
- Ernst, O., & Doucet, B. (2014). A window on the (changing) neighbourhood: The role of pubs in the contested spaces of gentrification. *Tijdschrift Voor Economische en Sociale Geografie*, 105(2), 189-205. <https://doi.org/10.1111/tesq.12071>
- Erol, A., & Karpyak, V. M. (2015). Sex and gender-related differences in alcohol use and its consequences: Contemporary knowledge and future research considerations. *Drug and Alcohol Dependence*, 156, 1-13. <https://doi.org/10.1016/j.drugalcdep.2015.08.023>
- Esch, T., Stefano, G. B., Fricchione, G. L., & Benson, H. (2002). The role of stress in neurodegenerative diseases and mental disorders. *Neuroendocrinology Letters*, 23(3), 199-208.
- Evans, G. W., & Kantrowitz, E. (2002). Socioeconomic status and health: the potential role of environmental risk exposure. *Annual Review of Public Health*, 23(1), 303-331. <https://doi.org/10.1146/annurev.publhealth.23.112001.112349>
- Ewing, J. A. (1984). Detecting alcoholism: the CAGE questionnaire. *Jama*, 252(14), 1905-1907. <https://doi.org/10.1001/jama.1984.03350140051025>
- Fagan, A. A., Wright, E. M., & Pinchevsky, G. M. (2015). A multi-level analysis of the impact of neighborhood structural and social factors on adolescent substance use. *Drug and Alcohol Dependence*, 153, 180-186. <https://doi.org/10.1016/j.drugalcdep.2015.05.022>
- Fageir, M., Porter, N., & Borsi, K. (2021). Contested grounds; the regeneration of Liverpool waterfront. *Planning Perspectives*, 36(3), 535-557. <https://doi.org/10.1080/02665433.2020.1804989>
- Farmer, T., Robinson, K., Elliott, S. J., & Eyles, J. (2006). Developing and implementing a triangulation protocol for qualitative health research. *Qualitative Health Research*, 16(3), 377-394. <https://doi.org/10.1177/1049732305285708>
- Field, M., Heather, N., & Wiers, R. W. (2019). Indeed, not really a brain disorder: Implications for reductionist accounts of addiction. *Behavioral and Brain Sciences*, 42, e9. <https://doi.org/10.1017/s0140525x18001024>
- Fieulaine, N., & Apostolidis, T. (2015). Precariousness as a time horizon: How poverty and social insecurity shape individuals' time perspectives. In M. Stolarski, N. Fieulaine, & W. van Beek (Eds.), *Time perspective theory; Review, research and application: Essays in honor of Philip G. Zimbardo* (pp. 213–228). Springer International Publishing/Springer Nature. https://doi.org/10.1007/978-3-319-07368-2_14
- Fite, P. J., Wynn, P., Lochman, J. E., & Wells, K. C. (2009). The influence of neighborhood disadvantage and perceived disapproval on early substance use initiation. *Addictive Behaviors*, 34(9), 769-771. <https://doi.org/10.1016/j.addbeh.2009.05.002>
- Foley, M., Reidy, M., & Wells, J. S. G. (2022). Recovery capital: stakeholder's experiences and expectations for enabling sustainable recovery from substance use in the South East Region of Ireland. *Journal of Substance Use*, 27(3), 283-288. <https://doi.org/10.1080/14659891.2021.1941342>
- Folland, S., Kaarbøe, O., & Islam, M. K. (2014). How do we invest in social capital? An exploration of an economic model of social capital and health. In S. Folland & L. Rocco (Eds.), *The economics of social capital and health* (Chapter 3, pp. 17–26). World Scientific.
- Fomiatti, R. (2020). 'It's good being part of the community and doing the right thing': (Re)problematizing 'community' in new recovery-oriented policy and consumer

- accounts. *International Journal of Drug Policy*, 80, 9. <https://doi.org/https://doi.org/10.1016/j.drugpo.2019.04.007>
- Fone, D. L., Farewell, D. M., White, J., Lyons, R. A., & Dunstan, F. D. (2013). Socioeconomic patterning of excess alcohol consumption and binge drinking: a cross-sectional study of multilevel associations with neighbourhood deprivation. *BMJ Open*, 3(4), e002337. <https://doi.org/10.1136/bmjopen-2012-002337>
- Fone, D., Dunstan, F., Lloyd, K., Williams, G., Watkins, J., & Palmer, S. (2007). Does social cohesion modify the association between area income deprivation and mental health? A multilevel analysis. *International Journal of Epidemiology*, 36(2), 338-345. <https://doi.org/10.1093/ije/dym004>
- Fone, D., White, J., Farewell, D., Kelly, M., John, G., Lloyd, K., ... & Dunstan, F. (2014). Effect of neighbourhood deprivation and social cohesion on mental health inequality: a multilevel population-based longitudinal study. *Psychological Medicine*, 44(11), 2449-2460. <https://doi.org/10.1017/S0033291713003255>
- Fong, P., Cruwys, T., Haslam, C., & Haslam, S. A. (2019). Neighbourhood identification and mental health: How social identification moderates the relationship between socioeconomic disadvantage and health. *Journal of Environmental Psychology*, 61, 101-114. <https://doi.org/10.1016/j.jenvp.2018.12.006>
- Fonseca, X., Lukosch, S., & Brazier, F. (2019). Social cohesion revisited: a new definition and how to characterize it. *Innovation: The European Journal of Social Science Research*, 32(2), 231-253. <https://doi.org/10.1080/13511610.2018.1497480>
- Forrest, R., & Kearns, A. (2001). Social cohesion, social capital and the neighbourhood. *Urban Studies*, 38(12), 2125-2143. <https://doi.org/10.1080/0042098012008708>
- Forsman, A. K., Nyqvist, F., Schierenbeck, I., Gustafson, Y., & Wahlbeck, K. (2012). Structural and cognitive social capital and depression among older adults in two Nordic regions. *Aging & Mental Health*, 16(6), 771-779. <https://doi.org/10.1080/13607863.2012.667784>
- Foster, K., & Spencer, D. (2013). 'It's just a social thing': drug use, friendship and borderwork among marginalized young people. *The International journal on drug policy*, 24(3), 223-230. <https://doi.org/10.1016/j.drugpo.2012.12.005>
- Foster, S., Gmel, G., Estévez, N., Bähler, C., & Mohler-Kuo, M. (2015). Temporal patterns of alcohol consumption and alcohol-related road accidents in young Swiss men: seasonal, weekday and public holiday effects. *Alcohol and Alcoholism*, 50(5), 565-572. <https://doi.org/10.1093/alcalc/agv037>
- Fotheringham, A. S., & Wong, D. W. (1991). The modifiable areal unit problem in multivariate statistical analysis. *Environment and Planning A*, 23(7), 1025-1044. <https://doi.org/10.1068/a231025>
- Foulds, J. A., Wells, J. E., Lacey, C. J., Adamson, S. J., Sellman, J. D., & Mulder, R. T. (2013). A comparison of alcohol measures as predictors of psychological distress in the New Zealand population. *International Journal of Alcohol and Drug Research*, 2(1), 59-67. <https://doi.org/10.7895/ijadr.v2i1.73>
- Fowler, K., Wareham-Fowler, S., & Barnes, C. (2013). Social context and depression severity and duration in Canadian men and women: exploring the influence of social support and sense of community belongingness. *Journal of Applied Social Psychology*, 43, E85-E96. <https://doi.org/10.1111/jasp.12050>
- Freedman, D.A. (2001), "Ecological inference and the ecological fallacy", in Smelser, N.J. and Baltes, P.B. (Eds), *International Encyclopedia for the Social and Behavioral Sciences*, Elsevier, New York, NY, pp. 4027-4030.
- Frost, M. C., Matson, T. E., Richards, J. E., Lee, A. K., Achtmeyer, C. E., Bradley, K. A., & Williams, E. C. (2022). Barriers and facilitators to changing drinking and receiving alcohol-related care: Interviews with Veterans Health Administration primary care patients who indicated interest but did not enroll in an alcohol care management intervention trial. *Substance abuse*, 43(1), 1197-1206. <https://doi.org/10.1080/08897077.2022.207460>

- Fujiwara, T., & Kawachi, I. (2008). A prospective study of individual-level social capital and major depression in the United States. *Journal of Epidemiology & Community Health*, 62(7), 627-633. <https://doi.org/10.1136/jech.2007.064261>
- Fukuyama, F. (1999). The great disruption. Human nature and the reconstitution of social order. London: Profile Book.
- Gaekwad, J. S., Sal Moslehian, A., Roös, P. B., & Walker, A. (2022). A meta-analysis of emotional evidence for the biophilia hypothesis and implications for biophilic design. *Frontiers in Psychology*, 13, 750245. <https://doi.org/10.3389/fpsyg.2022.750245>
- Galán, I., Simón, L., Rodríguez-Blázquez, C., Ortiz, C., López-Cuadrado, T., & Merlo, J. (2020). Individual and Contextual Factors Associated With Hazardous Drinking in Spain: Evidence From a National Population-Based Study. *Alcoholism: Clinical and Experimental Research*, 44(11), 2247-2256. <https://doi.org/10.1111/acer.14451>
- Galea, S., Ahern, J., Rudenstine, S., Wallace, Z., & Vlahov, D. (2005). Urban built environment and depression: a multilevel analysis. *Journal of Epidemiology & Community Health*, 59(10), 822-827. <https://doi.org/10.1136/jech.2005.033084>
- Garey, L., Olofsson, H., Garza, T., Rogers, A. H., Kauffman, B. Y., & Zvolensky, M. J. (2020). Directional effects of anxiety and depressive disorders with substance use: A review of recent prospective research. *Current Addiction Reports*, 7, 344-355. <https://doi.org/10.1007/s40429-020-00321-z>
- Gariépy, G., Honkaniemi, H., & Quesnel-Vallée, A. (2016). Social support and protection from depression: systematic review of current findings in Western countries. *The British Journal of Psychiatry*, 209(4), 284-293. <https://doi.org/10.1192/bjp.bp.115.169094>
- Garnett, C., Jackson, S., Oldham, M., Brown, J., Steptoe, A., & Fancourt, D. (2021). Factors associated with drinking behaviour during COVID-19 social distancing and lockdown among adults in the UK. *Drug and Alcohol Dependence*, 219, 108461. <https://doi.org/10.1016/j.drugalcdep.2020.108461>
- Gaume, J., Bertholet, N., & Daepfen, J. B. (2017). Readiness to change predicts drinking: findings from 12-month follow-up of alcohol use disorder outpatients. *Alcohol and Alcoholism*, 52(1), 65-71. <https://doi.org/10.1093/alcalc/agw047>
- Geibprasert, S., Gallucci, M., & Krings, T. (2010). Alcohol-induced changes in the brain as assessed by MRI and CT. *European Radiology*, 20, 1492-1501. <https://doi.org/10.1007/s00330-009-1668-z>
- Ghandour, L., Chalak, A., El-Aily, A., Yassin, N., Nakkash, R., Tauk, M., ... & Afifi, R. (2016). Alcohol consumption in the Arab region: what do we know, why does it matter, and what are the policy implications for youth harm reduction?. *International Journal of Drug Policy*, 28, 10-33. <https://doi.org/10.1016/j.drugpo.2015.09.013>
- Giordano, G. N., & Lindström, M. (2011). The impact of social capital on changes in smoking behaviour: A longitudinal cohort study. *European Journal of Public Health*, 21(3), 347-354. <https://doi.org/https://doi.org/10.1093/eurpub/ckq048>
- Gkiouleka, A., Huijts, T., Beckfield, J., & Bambra, C. (2018). Understanding the micro and macro politics of health: Inequalities, intersectionality & institutions-A research agenda. *Social Science & Medicine*, 200, 92-98. <https://doi.org/10.1016/j.socscimed.2018.01.025>
- Gmel, G., Holmes, J., & Studer, J. (2016). Are alcohol outlet densities strongly associated with alcohol-related outcomes? A critical review of recent evidence. *Drug and Alcohol Review*, 35(1), 40-54. <https://doi.org/10.1111/dar.12304>
- Goldberg, D. P., & Williams, P. (1988). A user's guide to the General Health Questionnaire. Windsor, UK: NFER-Nelson.
- Goldwater, D., Karlamangla, A., Merkin, S. S., & Seeman, T. (2019). Compared to non-drinkers, individuals who drink alcohol have a more favorable multisystem physiologic risk score as measured by allostatic load. *PLoS One*, 14(9), e0223168. <https://doi.org/10.1371/journal.pone.0223168>

- Gondal, N. (2023). Diffusion of innovations through social networks: Determinants and implications [Review]. *Sociology Compass*, 17(5), 17. <https://doi.org/10.1111/soc4.13084>
- Goodwin, K. (2016, June 10). The Glasgow effect: 'We die young here - but you just get on with it'. *The Guardian*. <https://www.theguardian.com/cities/2016/jun/10/glasgow-effect-die-young-high-risk-premature-death#:~:text=Glaswegians%20have%20a%2030%25%20higher,of%20drugs%2C%20alcohol%20and%20suicide>.
- Gottlieb, B. H., & Bergen, A. E. (2010). Social support concepts and measures. *Journal of Psychosomatic Research*, 69(5), 511-520. <https://doi.org/10.1016/j.jpsychores.2009.10.001>
- Granfield, R., & Cloud, W. (2001). Social context and "natural recovery": The role of social capital in the resolution of drug-associated problems. *Substance Use & Misuse*, 36(11), 1543–1570. <https://doi.org/10.1081/JA-100106963>
- Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360-1380.
- Grant, B. F., Goldstein, R. B., Saha, T. D., Chou, S. P., Jung, J., Zhang, H., ... & Hasin, D. S. (2015). Epidemiology of DSM-5 alcohol use disorder: results from the National Epidemiologic Survey on Alcohol and Related Conditions III. *JAMA Psychiatry*, 72(8), 757-766. <https://doi.org/10.1001/jamapsychiatry.2015.0584>
- Greene, J. C. (2007). *Mixed methods in social inquiry* (Vol. 9). John Wiley & Sons.
- Greiner, K. A., Li, C., Kawachi, I., Hunt, D. C., & Ahluwalia, J. S. (2004). The relationships of social participation and community ratings to health and health behaviors in areas with high and low population density. *Social Science & Medicine*, 59(11), 2303-2312. <https://doi.org/10.1016/j.socscimed.2004.03.023>
- Griffiths, M. (2005). A 'components' model of addiction within a biopsychosocial framework. *Journal of Substance Use*, 10(4), 191-197. <https://doi.org/10.1080/14659890500114359>
- Grimm, K. J., Ram, N., & Estabrook, R. (2017). Growth modeling: structural equation and Multilevel Modeling Approaches. New York, NY: Guilford Publications.
- Grinde, B., & Patil, G. G. (2009). Biophilia: does visual contact with nature impact on health and well-being?. *International Journal of Environmental Research and Public Health*, 6(9), 2332-2343. <https://doi.org/10.3390/ijerph6092332>
- Griswold, M. G., Fullman, N., Hawley, C., Arian, N., Zimsen, S. R., Tymeson, H. D., ... & Farioli, A. (2018). Alcohol use and burden for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *The Lancet*, 392(10152), 1015-1035. [https://doi.org/10.1016/S0140-6736\(18\)31310-2](https://doi.org/10.1016/S0140-6736(18)31310-2)
- Grittner, U., Wilsnack, S., Kuntsche, S., Greenfield, T. K., Wilsnack, R., Kristjanson, A., & Bloomfield, K. (2020). A multilevel analysis of regional and gender differences in the drinking behavior of 23 countries. *Substance Use & Misuse*, 55(5), 772-786. <https://doi.org/10.1080/10826084.2019.1702700>
- Gruebner, O., Rapp, M. A., Adli, M., Kluge, U., Galea, S., & Heinz, A. (2017). Cities and mental health. *Deutsches Ärzteblatt International*, 114(8), 121. <https://doi.org/10.3238/arztebl.2017.0121>
- Gruenewald, P. J. (2007). The spatial ecology of alcohol problems: niche theory and assortative drinking. *Addiction*, 102(6), 870-878. <https://doi.org/10.1111/j.1360-0443.2007.01856.x>
- Gruenewald, P. J., Remer, L. G., & LaScala, E. A. (2014). Testing a social ecological model of alcohol use: the California 50-city study. *Addiction*, 109(5), 736-745. <https://doi.org/10.1111/add.12438>
- Gunn, R. L., Aston, E. R., & Metrik, J. (2022). Patterns of cannabis and alcohol co-use: Substitution versus complementary effects. *Alcohol Research: Current Reviews*, 42(1). <https://doi.org/10.35946/arcr.v42.1.04>
- Gurrieri, L., Fairbairn, C. E., Sayette, M. A., & Bosch, N. (2021). Alcohol narrows physical distance between strangers. *PNAS Proceedings of the National Academy of Sciences*

- of the United States of America, 118(20), Article e2101937118. <https://doi.org/10.1073/pnas.2101937118>
- Guthrie, L. C., Butler, S. C., & Ward, M. M. (2009). Time perspective and socioeconomic status: A link to socioeconomic disparities in health? *Social Science & Medicine*, 68(12), 2145–2151. <https://doi.org/10.1016/j.socscimed.2009.04.004>
- Haapea, M., Miettunen, J., Läärä, E., Joukamaa, M. I., Järvelin, M. R., Isohanni, M. K., & Veijola, J. M. (2008). Non-participation in a field survey with respect to psychiatric disorders. *Scandinavian Journal of Public Health*, 36(7), 728-736. <https://doi.org/10.1177/1403494808092250>
- Hackman, D. A., Farah, M. J., & Meaney, M. J. (2010). Socioeconomic status and the brain: mechanistic insights from human and animal research. *Nature Reviews Neuroscience*, 11(9), 651-659. <https://doi.org/10.1038/nrn2897>
- Hafsa, N. E. (2019). Mixed methods research: An overview for beginner researchers. *Journal of Literature, Languages and Linguistics*, 58(1), p45-48. <https://doi.org/10.7176/JLLL>
- Haighton, C., Kidd, J., O'Donnell, A., Wilson, G., McCabe, K., & Ling, J. (2018). 'I take my tablets with the whiskey': A qualitative study of alcohol and medication use in mid to later life. *PLoS One*, 13(10), e0205956. <https://doi.org/10.1371/journal.pone.0205956>
- Hall, P. A. (1999). Social capital in Britain. *British Journal of Political Science*, 29(3), 417-461. <https://doi.org/10.1017/S0007123499000204>
- Halsall, T., Mahmoud, K., Iyer, S. N., Orpana, H., Zeni, M., & Matheson, K. (2023). Implications of time and space factors related with youth substance use prevention: a conceptual review and case study of the Icelandic Prevention Model being implemented in the context of the COVID-19 pandemic. *International Journal of Qualitative Studies on Health and Well-being*, 18(1), 2149097. <https://doi.org/10.1080/17482631.2022.2149097>
- Hamano, T., Fujisawa, Y., Ishida, Y., Subramanian, S. V., Kawachi, I., & Shiwaaku, K. (2010). Social capital and mental health in Japan: a multilevel analysis. *PloS one*, 5(10), e13214. <https://doi.org/10.1371/journal.pone.0013214>
- Hamano, T., Li, X. J., Sundquist, J., & Sundquist, K. (2019). Neighborhood linking social capital as a predictor of lung cancer: A Swedish national cohort study [Article]. *Cancer Epidemiology*, 61, 23-29. <https://doi.org/10.1016/j.canep.2019.05.005>
- Hampson, T., & McKinley, J. (2023). Problems posing as solutions: Criticising pragmatism as a paradigm for mixed research. *Research in Education*, 116(1), 124-138. <https://doi.org/10.1177/00345237231160085>
- Han, S. (2019). Social capital and perceived stress: The role of social context. *Journal of Affective Disorders*, 250, 186-192. <https://doi.org/10.1016/j.jad.2019.03.034>
- Handley, C. E., Oakley, D., & Saville, C. W. (2020). Residential churn moderates the relationship between economic deprivation and psychiatric admission: evidence from Wales. *Journal of Epidemiology & Community Health*, 74(7), 560-564. <https://doi.org/10.1136/jech-2019-213351>
- Handlovsky, I. E., Bungay, V., Johnson, J., & Phillips, J. C. (2013). The Process of Safer Crack Use Among Women in Vancouver's Downtown Eastside [Article]. *Qualitative Health Research*, 23(4), 450-462. <https://doi.org/10.1177/1049732312469465>
- Hanlon, P., Lawder, R. S., Buchanan, D., Redpath, A., Walsh, D., Wood, R., ... & Walsh, D. (2005). Why is mortality higher in Scotland than in England and Wales? Decreasing influence of socioeconomic deprivation between 1981 and 2001 supports the existence of a 'Scottish Effect'. *Journal of Public Health*, 27(2), 199-204. <https://doi.org/10.1093/pubmed/fdi002>
- Hardie, I., Stevely, A. K., Sasso, A., Meier, P. S., & Holmes, J. (2022). The impact of changes in COVID-19 lockdown restrictions on alcohol consumption and drinking occasion characteristics in Scotland and England in 2020: An interrupted time-series analysis. *Addiction*, 117(6), 1622–1639. <https://doi.org/10.1111/add.15794>
- Harper, D. (2002). Talking about pictures: A case for photo elicitation. *Visual studies*, 17(1), 13-26. <https://doi.org/10.1080/14725860220137345>

- Harris, J., Dalkin, S., Jones, L., Ainscough, T., Maden, M., Bate, A., ... & Hughes, E. (2023). Achieving integrated treatment: a realist synthesis of service models and systems for co-existing serious mental health and substance use conditions. *The Lancet Psychiatry*, 10(8), 632-643. [https://doi.org/10.1016/S2215-0366\(23\)00104-9](https://doi.org/10.1016/S2215-0366(23)00104-9)
- Harrison, R., Blickem, C., Lamb, J., Kirk, S., & Vassilev, I. (2019). Asset-based community development: narratives, practice, and conditions of possibility—a qualitative study with community practitioners. *Sage Open*, 9(1), 2158244018823081. <https://doi.org/10.1177/2158244018823081>
- Haseda, M., Kondo, N., Takagi, D., & Kondo, K. (2018). Community social capital and inequality in depressive symptoms among older Japanese adults: a multilevel study. *Health & Place*, 52, 8-17. <https://doi.org/10.1016/j.healthplace.2018.04.010>
- Hashmi, R., Alam, K., Gow, J., & March, S. (2021). Prevalence of mental disorders by socioeconomic status in Australia: a cross-sectional epidemiological study. *American Journal of Health Promotion*, 35(4), 533-542. <https://doi.org/10.1177/0890117120968656>
- Hasking, P., Lyvers, M., & Carliopio, C. (2011). The relationship between coping strategies, alcohol expectancies, drinking motives and drinking behaviour. *Addictive Behaviors*, 36(5), 479-487. <https://doi.org/10.1016/j.addbeh.2011.01.014>
- Hassett-Walker, C. (2023). Recovering individuals' feelings about addict and alcoholic as stigmatized terms: implications for treatment. *Substance Abuse: Research and Treatment*, 17, 1-9. <https://doi.org/10.1177/11782218231213769>
- Hawkins, B., Holden, C., & McCambridge, J. (2012). Alcohol industry influence on UK alcohol policy: a new research agenda for public health. *Critical Public Health*, 22(3), 297-305. <https://doi.org/10.1080/09581596.2012.658027>
- Hay, G. C., Whigham, P. A., Kypri, K., & Langley, J. D. (2009). Neighbourhood deprivation and access to alcohol outlets: a national study. *Health & Place*, 15(4), 1086-1093. <https://doi.org/10.1016/j.healthplace.2009.05.008>
- Heacock, R. M., Capodilupo, E. R., Czeisler, M. É., Weaver, M. D., Czeisler, C. A., Howard, M. E., & Rajaratnam, S. M. (2022). Sleep and alcohol use patterns during federal holidays and daylight saving time transitions in the United States. *Frontiers in Physiology*, 13, 884154. <https://doi.org/10.3389/fphys.2022.884154>
- Heilig, M., MacKillop, J., Martinez, D., Rehm, J., Leggio, L., & Vanderschuren, L. J. (2021). Addiction as a brain disease revised: why it still matters, and the need for consilience. *Neuropsychopharmacology*, 46(10), 1715-1723. <https://doi.org/10.1038/s41386-020-00950-y>
- Helbich, M., Hagenauer, J., & Roberts, H. (2020). Relative importance of perceived physical and social neighborhood characteristics for depression: a machine learning approach. *Social Psychiatry and Psychiatric Epidemiology*, 55, 599-610. <https://doi.org/10.1007/s00127-019-01808-5>
- Henderson, H., Child, S., Moore, S., Moore, J. B., & Kaczynski, A. T. (2016). The influence of neighborhood aesthetics, safety, and social cohesion on perceived stress in disadvantaged communities. *American Journal of Community Psychology*, 58(1-2), 80-88. <https://doi.org/10.1002/ajcp.12081>
- Henke, C.R., & Gieryn, T.F. (2008). Sites of scientific practice: the enduring importance of place. In: E.J. Hackett, et al., (Eds.), *The handbook of science and technology studies*. (3rd ed., pp. 353– 376). Cambridge: MIT Press.
- Heseltine Institute for Public Policy, Practice and Place. (2021). Bridging the community asset gap in Liverpool City Region. Available at: https://www.liverpool.ac.uk/media/livacuk/humanitiesampsocialsciences/documents/Heseltine_Institute_Bridging_the_asset_data_gap_Report_FINAL.pdf (Accessed 12 June 2024)
- Higgins-Biddle, J. C., & Babor, T. F. (2018). A review of the Alcohol Use Disorders Identification Test (AUDIT), AUDIT-C, and USAUDIT for screening in the United States: Past issues and future directions. *The American Journal of Drug and Alcohol Abuse*, 44(6), 578-586. <https://doi.org/10.1080/00952990.2018.1456545>

- Hill, K. M., Foxcroft, D. R., & Pilling, M. (2018). "Everything is telling you to drink": Understanding the functional significance of alcogenic environments for young adult drinkers. *Addiction Research & Theory*, 26(6), 457-464. <https://doi.org/10.1080/16066359.2017.1395022>
- Hillery, G. (1955). Definitions of community Areas of agreement. *Rural Sociology*, 20, 111-123.
- Hirschi, T. (1969). Causes of delinquency. Berkeley, CA: University of California Press.
- Holmes, J., Ally, A. K., Meier, P. S., & Pryce, R. (2019). The collectivity of British alcohol consumption trends across different temporal processes: a quantile age-period-cohort analysis. *Addiction*, 114(11), 1970-1980. <https://doi.org/10.1111/add.14754>
- Holmes, J., Meng, Y., Meier, P. S., Brennan, A., Angus, C., Campbell-Burton, A., ... & Purshouse, R. C. (2014). Effects of minimum unit pricing for alcohol on different income and socioeconomic groups: a modelling study. *The Lancet*, 383(9929), 1655-1664. [https://doi.org/10.1016/S0140-6736\(13\)62417-4](https://doi.org/10.1016/S0140-6736(13)62417-4)
- Holmes, J., Sasso, A., Alava, M. H., Neves, R. B., Stevely, A. K., Warde, A., & Meier, P. S. (2024). How is alcohol consumption and heavy episodic drinking spread across different types of drinking occasion in Great Britain: An event-level latent class analysis. *International Journal of Drug Policy*, 127, 104414. <https://doi.org/10.1016/j.drugpo.2024.104414>
- Hong, S., Zhang, W., & Walton, E. (2014). Neighborhoods and mental health: Exploring ethnic density, poverty, and social cohesion among Asian Americans and Latinos. *Social Science & Medicine*, 111, 117-124. <https://doi.org/10.1016/j.socscimed.2014.04.014>
- Hoyland, M. A., & Latendresse, S. J. (2018). Stressful life events influence transitions among latent classes of alcohol use. *Psychology of Addictive Behaviors*, 32(7), 727-737. <https://doi.org/10.1037/adb0000412>
- Humphreys, K., Mankowski, E. S., Moos, R. H., & Finney, J. W. (1999). Do enhanced friendship networks and active coping mediate the effect of self-help groups on substance abuse? *Annals of Behavioral Medicine*, 21(1), 54-60. <https://doi.org/10.1007/BF02895034>
- Hurcombe, R., Bayley, M., & Goodman, A. (2010). Ethnicity and alcohol: a review of the UK literature.
- Hutcheon, D., & Steiner, A. (2022). The role of community-led organisations in creating social infrastructure for the health and wellbeing of disadvantaged populations: a qualitative study. *Lancet*, 400, S7. [https://doi.org/10.1016/S0140-6736\(22\)02217-6](https://doi.org/10.1016/S0140-6736(22)02217-6)
- Hystad, J., & Bergly, T. H. (2021). Experiences of playing golf as a part of the treatment and rehabilitation process among patients in substance use disorder treatment [Article]. *Journal of Substance Use*, 26(2), 184-189. <https://doi.org/10.1080/14659891.2020.1800845>
- IBM Corp. (2021). *IBM SPSS Statistics for Windows, Version 28.0*. Armonk, NY: IBM Corp.
- Ige-Elegbede, J., Pilkington, P., Orme, J., Williams, B., Prestwood, E., Black, D., & Carmichael, L. (2022). Designing healthier neighbourhoods: a systematic review of the impact of the neighbourhood design on health and wellbeing. *Cities & Health*, 6(5), 1004-1019. <https://doi.org/10.1080/23748834.2020.1799173>
- Institute of Alcohol Studies. (2020). *The costs of alcohol to society* (Alcohol Knowledge Centre briefing). Available at: <https://www.ias.org.uk/wp-content/uploads/2020/12/The-costs-of-alcohol-to-society.pdf> (Accessed 12 June 2024)
- Irizar, P., Leightley, D., Stevelink, S., Rona, R., Jones, N., Gouni, K., ... & Goodwin, L. (2020). Drinking motivations in UK serving and ex-serving military personnel. *Occupational Medicine*, 70(4), 259-267. <https://doi.org/10.1093/occmed/kqaa003>
- Islam, M. K., Folland, S., & Kaarb  e, O. M. (2017). Social capital and cigarette smoking: New empirics featuring the Norwegian HUNT data. *Economics and human biology*, 26, 174-185. <https://doi.org/10.1016/j.ehb.2017.04.003>
- Ivey, S. L., Kealey, M., Kurtovich, E., Hunter, R. H., Prohaska, T. R., Bayles, C. M., & Satariano, W. A. (2015). Neighborhood characteristics and depressive symptoms in

- an older population. *Aging & Mental Health*, 19(8), 713-722. <https://doi.org/10.1080/13607863.2014.962006>
- Izenberg, J. M., & Fullilove, M. T. (2016). Hospitality invites sociability, which builds cohesion: a model for the role of main streets in population mental health. *Journal of Urban Health*, 93, 292-311. <https://doi.org/10.1007/s11524-016-0027-z>
- Izenberg, J. M., Mujahid, M. S., & Yen, I. H. (2018). Gentrification and binge drinking in California neighborhoods: It matters how long you've lived there [Article]. *Drug and Alcohol Dependence*, 188, 1-9. <https://doi.org/10.1016/j.drugalcdep.2018.03.018>
- Jackson, N., Denny, S., & Ameratunga, S. (2014). Social and socio-demographic neighborhood effects on adolescent alcohol use: A systematic review of multi-level studies. *Social Science & Medicine*, 115, 10-20. <https://doi.org/10.1016/j.socscimed.2014.06.004>
- Jackson, N., Denny, S., Sheridan, J., Fleming, T., Clark, T., Teevale, T., & Ameratunga, S. (2014). Predictors of drinking patterns in adolescence: a latent class analysis. *Drug and Alcohol Dependence*, 135, 133-139. <https://doi.org/10.1016/j.drugalcdep.2013.11.021>
- Jackson, N., Denny, S., Sheridan, J., Zhao, J., & Ameratunga, S. (2016). The role of neighborhood disadvantage, physical disorder, and collective efficacy in adolescent alcohol use: a multilevel path analysis. *Health & Place*, 41, 24-33. <https://doi.org/10.1016/j.healthplace.2016.07.005>
- Jacobs, L., Conroy, D., & Parke, A. (2018). Negative experiences of non-drinking college students in Great Britain: An interpretative phenomenological analysis. *International Journal of Mental Health and Addiction*, 16, 737-750. <https://doi.org/10.1007/s11469-017-9848-6>
- Jagosh, J. (2019). Realist synthesis for public health: building an ontologically deep understanding of how programs work, for whom, and in which contexts. *Annual Review of Public Health*, 40, 361-372. <https://doi.org/10.1146/annurev-publhealth-031816-044451>
- Jane-Llopis, E. V. A., & Matytsina, I. (2006). Mental health and alcohol, drugs and tobacco: a review of the comorbidity between mental disorders and the use of alcohol, tobacco and illicit drugs. *Drug and Alcohol Review*, 25(6), 515-536. <https://doi.org/10.1080/09595230600944461>
- Jellinek, E. M. (1960). *The disease concept of alcoholism*. <https://doi.org/10.1037/14090-000>
- Jenks, M., & Dempsey, N. (2007). Defining the neighbourhood: Challenges for empirical research. *Town Planning Review*, 78(2), 153-177. <https://doi.org/10.3828/tpr.78.2.4>
- Jiang, L. (2011). Comparison of the difference between Chinese and Western drinking culture. *Asian Social Science*, 7(5), 251. <https://doi.org/10.5539/ass.v7n5p251>
- Johar, H., Atasoy, S., Beutel, M., Braehler, E., Schomerus, G., Binder, H., Peters, A., Zöller, D., Fleischer, T., Otten, D., Kampling, H., Kruse, J., & Ladwig, K.-H. (2023). Gender-differential association between loneliness and alcohol consumption: A pooled analysis of 17,808 individuals in the multi-cohort gesa consortium. *International Journal of Mental Health and Addiction*. Advance online publication. <https://doi.org/10.1007/s11469-023-01121-y>
- John, U., Rumpf, H. J., Hanke, M., & Meyer, C. (2021). Alcohol abstinence and mortality in a general population sample of adults in Germany: A cohort study. *PLoS Medicine*, 18(11), e1003819. <https://doi.org/10.1371/journal.pmed.1003819>
- Johnson, M., Jackson, R., Guillaume, L., Meier, P., & Goyder, E. (2011). Barriers and facilitators to implementing screening and brief intervention for alcohol misuse: a systematic review of qualitative evidence. *Journal of Public Health*, 33(3), 412-421. <https://doi.org/10.1093/pubmed/fdq095>
- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, 33(7), 14-26. <https://doi.org/10.3102/0013189X033007014>

- Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research*, 1(2), 112-133. <https://doi.org/10.1177/1558689806298224>
- Jokela, M., Batty, G. D., Vahtera, J., Elovainio, M., & Kivimäki, M. (2013). Socioeconomic inequalities in common mental disorders and psychotherapy treatment in the UK between 1991 and 2009. *The British Journal of Psychiatry*, 202(2), 115-120. <http://doi.org/10.1192/bjp.bp.111.098863>
- Jones, B. T., Corbin, W., & Fromme, K. (2001). A review of expectancy theory and alcohol consumption. *Addiction*, 96(1), 57-72. <https://doi.org/10.1046/j.1360-0443.2001.961575.x>
- Jones, L., & Sumnall, H. (2016). *Understanding the relationship between poverty and alcohol misuse*. Liverpool: Liverpool John Moores University. Available at: <https://www.drugsandalcohol.ie/25676/1/Understanding-the-relationship-between-poverty-and-alcohol-abuse-2.pdf> (Accessed 8 July 2024)
- Jones, L., McCoy, E., Bates, G., Bellis, M. A., et al. (2015). Understanding the alcohol harm paradox in order to focus the development of interventions. Liverpool, Centre for Public Health, Liverpool John Moores University.
- Jonsson, K. R., Busfield, J., Södergren, M., Karen, M., & Adjei, N. K. (2020). Social capital, deprivation and psychological well-being among young adolescents: a multilevel study from England and Wales. *International Journal of Environmental Research and Public Health*, 17(10), 3420. <https://doi.org/10.3390/ijerph17103420>
- Jung, T., & Wickrama, K. A. (2008). An introduction to latent class growth analysis and growth mixture modeling. *Social and Personality Psychology Compass*, 2(1), 302-317. <https://doi.org/10.1111/j.1751-9004.2007.00054.x>
- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge, MA: Cambridge University Press.
- Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, 15(3), 169-182. [https://doi.org/10.1016/0272-4944\(95\)90001-2](https://doi.org/10.1016/0272-4944(95)90001-2)
- Karasek, D., Ahern, J., & Galea, S. (2012). Social norms, collective efficacy, and smoking cessation in urban neighborhoods. *American Journal of Public Health*, 102(2), 343-351. <https://doi.org/https://doi.org/10.2105/AJPH.2011.300364>
- Karriker-Jaffe, K. J. (2011). Areas of disadvantage: A systematic review of effects of area-level socioeconomic status on substance use outcomes. *Drug and Alcohol Review*, 30(1), 84-95. <https://doi.org/10.1111/j.1465-3362.2010.00191.x>
- Karriker-Jaffe, K. J. (2013). Neighborhood socioeconomic status and substance use by US adults. *Drug and Alcohol Dependence*, 133(1), 212-221. <https://doi.org/10.1016/j.drugalcdep.2013.04.033>
- Karriker-Jaffe, K. J., Liu, H., & Kaplan, L. M. (2016). Understanding associations between neighborhood socioeconomic status and negative consequences of drinking: a moderated mediation analysis. *Prevention Science*, 17(4), 513-524. <https://doi.org/10.1007/s11121-016-0641-8>
- Karriker-Jaffe, K. J., Lönn, S. L., Cook, W. K., Kendler, K. S., & Sundquist, K. (2018). Chains of risk for alcohol use disorder: Mediators of exposure to neighborhood deprivation in early and middle childhood. *Health & Place*, 50, 16-26. <https://doi.org/10.1016/j.healthplace.2017.12.008>
- Karriker-Jaffe, K. J., Witbrodt, J., Mericle, A. A., Polcin, D. L., & Kaskutas, L. A. (2020). Testing a socioecological model of relapse and recovery from alcohol problems. *Substance Abuse: Research and Treatment*, 14, Article 1178221820933631. <https://doi.org/10.1177/1178221820933631>
- Katainen, A., Härkönen, J., & Mäkelä, P. (2022). Non-drinkers' experiences of drinking occasions: A population-based study of social consequences of abstaining from alcohol. *Substance use & misuse*, 57(1), 57-66. <https://doi.org/10.1080/10826084.2021.1990331>

- Kawachi, I., & Berkman, L. (2000). Social cohesion, social capital, and health. *Social Epidemiology*, 174(7), 290-319.
- Kearns, A., Whitley, E., Bond, L., Egan, M., & Tannahill, C. (2013). The psychosocial pathway to mental well-being at the local level: Investigating the effects of perceived relative position in a deprived area context. *Journal of Epidemiology and Community Health*, 67(1), 87–94. <https://doi.org/10.1136/jech-2011-200415>
- Kelly, J. F., Hoepfner, B., Stout, R. L., & Pagano, M. (2012). Determining the relative importance of the mechanisms of behavior change within Alcoholics Anonymous: A multiple mediator analysis. *Addiction*, 107(2), 289-299. <https://doi.org/10.1111/j.1360-0443.2011.03593.x>
- Kelly, J. F., Humphreys, K., & Ferri, M. (2020). Alcoholics Anonymous and other 12-step programs for alcohol use disorder. *Cochrane Database of Systematic Reviews*, (3). <https://doi.org/10.1002/14651858.CD012880.pub2>
- Kelly, J. F., Magill, M., & Stout, R. L. (2009). How do people recover from alcohol dependence? A systematic review of the research on mechanisms of behavior change in Alcoholics Anonymous. *Addiction Research & Theory*, 17(3), 236-259. <https://doi.org/10.1080/16066350902770458>
- Kelly, S., Olanrewaju, O., Cowan, A., Brayne, C., & Lafortune, L. (2018). Alcohol and older people: A systematic review of barriers, facilitators and context of drinking in older people and implications for intervention design. *PloS one*, 13(1), e0191189. <https://doi.org/10.1371/journal.pone.0191189>
- Kendler, K. S., Ohlsson, H., Karriker-Jaffe, K. J., Sundquist, J., & Sundquist, K. (2017). Social and economic consequences of alcohol use disorder: a longitudinal cohort and co-relative analysis. *Psychological Medicine*, 47(5), 925-935. <https://doi.org/10.1017/S0033291716003032>
- Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62(6), 617-627. <https://doi.org/10.1001/archpsyc.62.6.617>
- Keyes, K. M., Hatzenbuehler, M. L., & Hasin, D. S. (2011). Stressful life experiences, alcohol consumption, and alcohol use disorders: the epidemiologic evidence for four main types of stressors. *Psychopharmacology*, 218, 1-17. <https://doi.org/10.1007/s00213-011-2236-1>
- Keyes, K. M., Hatzenbuehler, M. L., Grant, B. F., & Hasin, D. S. (2012). Stress and alcohol: epidemiologic evidence. *Alcohol Research: Current Reviews*, 34(4), 391.
- Khadjesari, Z., White, I. R., McCambridge, J., Marston, L., Wallace, P., Godfrey, C., & Murray, E. (2017). Validation of the AUDIT-C in adults seeking help with their drinking online. *Addiction Science & Clinical Practice*, 12, 1-11. <https://doi.org/10.1186/s13722-016-0066-5>
- Khantzian, E. J. (1990). Self-regulation and self-medication factors in alcoholism and the addictions: Similarities and differences. In M. Galanter (Ed.), *Recent developments in alcoholism, Vol. 8. Combined alcohol and other drug dependence* (pp. 255–271). Plenum Press.
- Khantzian, E. J. (1997). The self-medication hypothesis of substance use disorders: A reconsideration and recent applications. *Harvard Review of Psychiatry*, 4(5), 231-244. <https://doi.org/10.3109/10673229709030550>
- Khantzian, E. J. (2003). The self-medication hypothesis revisited: The dually diagnosed patient. *Primary Psychiatry*, 10(9), 47–54.
- Kiani, M. M., Takian, A., Farzadfar, F., Rezaei, S., & Zandian, H. (2023). The Relationships between Social Capital, Metabolic, and Behavioral Risk Factors of Non-Communicable Diseases: A Systematic Review [Review]. *Iranian Journal of Public Health*, 52(9), 1803-1817. <https://doi.org/10.18502/ijph.v52i9.13563>

- Kievit, R. A., Frankenhuis, W. E., Waldorp, L. J., & Borsboom, D. (2013). Simpson's paradox in psychological science: a practical guide. *Frontiers in Psychology*, 4, 513. <https://doi.org/10.3389/fpsyg.2013.00513>
- Kilanowski, J. F. (2017). Breadth of the socio-ecological model. *Journal of Agromedicine*, 22(4), 295-297. <https://doi.org/10.1080/1059924X.2017.1358971>
- Kilian, C., Manthey, J., Carr, S., Hanschmidt, F., Rehm, J., Speerforck, S., & Schomerus, G. (2021). Stigmatization of people with alcohol use disorders: an updated systematic review of population studies. *Alcoholism: Clinical and Experimental Research*, 45(5), 899-911. <https://doi.org/10.1111/acer.14598>
- Kilian, C., O'Donnell, A., Potapova, N., López-Pelayo, H., Schulte, B., Miquel, L., ... & Manthey, J. (2022). Changes in alcohol use during the COVID-19 pandemic in Europe: A meta-analysis of observational studies. *Drug and Alcohol Review*, 41(4), 918-931. <https://doi.org/10.1111/dar.13446>
- Kim, E. S., Chen, Y., Kawachi, I., & VanderWeele, T. J. (2020). Perceived neighborhood social cohesion and subsequent health and well-being in older adults: An outcome-wide longitudinal approach. *Health & Place*, 66, 8. <https://doi.org/https://doi.org/10.1016/j.healthplace.2020.102420>
- Kim, J. (2010). Neighborhood disadvantage and mental health: The role of neighborhood disorder and social relationships. *Social Science Research*, 39(2), 260-271. <https://doi.org/10.1016/j.ssresearch.2009.08.007>
- Kim, J. U., Majid, A., Judge, R., Crook, P., Nathwani, R., Selvapatt, N., ... & Lemoine, M. (2020). Effect of COVID-19 lockdown on alcohol consumption in patients with pre-existing alcohol use disorder. *The Lancet Gastroenterology & Hepatology*, 5(10), 886-887. [https://doi.org/10.1016/S2468-1253\(20\)30251-X](https://doi.org/10.1016/S2468-1253(20)30251-X)
- Kingsbury, M., Kirkbride, J. B., McMartin, S. E., Wickham, M. E., Weeks, M., & Colman, I. (2015). Trajectories of childhood neighbourhood cohesion and adolescent mental health: evidence from a national Canadian cohort. *Psychological Medicine*, 45(15), 3239-3248. <https://doi.org/10.1017/S0033291715001245>
- Klinenberg, E. (2018). *Palaces for the People: How Social Infrastructure Can Help Fight Inequality, Polarization, and the Decline of Civic Life*. New York, NY: Crown.
- Knott, C. S., Bell, S., & Britton, A. (2018). The stability of baseline-defined categories of alcohol consumption during the adult life-course: A 28-year prospective cohort study. *Addiction*, 113(1), 34-43. <https://doi.org/10.1111/add.13949>
- Kobayashi, T., Suzuki, E., Noguchi, M., Kawachi, I., & Takao, S. (2015). Community-level social capital and psychological distress among the elderly in Japan: A population-based study. *PLoS One*, 10(11), e0142629. <https://doi.org/10.1371/journal.pone.0142629>
- Kopacz, M. S., Ames, D., & Koenig, H. G. (2018). Association between trust and mental, social, and physical health outcomes in veterans and active duty service members with combat-related PTSD symptomatology. *Frontiers in Psychiatry*, 9, 408. <https://doi.org/10.3389/fpsyg.2018.00408>
- Kosterman, R., Hill, K. G., Lee, J. O., Meacham, M. C., Abbott, R. D., Catalano, R. F., & Hawkins, J. D. (2014). Young adult social development as a mediator of alcohol use disorder symptoms from age 21 to 30. *Psychology of addictive behaviors : journal of the Society of Psychologists in Addictive Behaviors*, 28(2), 348-358. <https://doi.org/10.1037/a0034970>
- Kougiali, Z. G., Pytlik, A., & Soar, K. (2021). Mechanisms and processes involved in women's pathways into alcohol dependence and towards recovery: a qualitative meta-synthesis. *Drugs: Education, Prevention and Policy*, 28(5), 437-453. <https://doi.org/10.1080/09687637.2021.1904836>
- Kraus, L., Seitz, N. N., Piontek, D., Molinaro, S., Siciliano, V., Guttormsson, U., ... & Hibell, B. (2018). 'Are the times A-Changin'? Trends in adolescent substance use in Europe. *Addiction*, 113(7), 1317-1332. <https://doi.org/10.1111/add.14201>

- Kreek, M. J., & Koob, G. F. (1998). Drug dependence: stress and dysregulation of brain reward pathways. *Drug and Alcohol Dependence*. [https://doi.org/10.1016/S0376-8716\(98\)00064-7](https://doi.org/10.1016/S0376-8716(98)00064-7)
- Kretzmann, J. P., & McKnight, J. (1993). *Building communities from the inside out: A path toward finding and mobilizing community assets*. Chicago, IL: ACTA Publications.
- Kretzmann, J., & McKnight, J. P. (1996). Assets-based community development. *National Civic Review*, 85, 23-29. <https://doi.org/10.1002/ncr.4100850405>
- Krueger, E. A., Fish, J. N., & Upchurch, D. M. (2020). Sexual orientation disparities in substance use: Investigating social stress mechanisms in a national sample. *American Journal of Preventive Medicine*, 58(1), 59-68. <https://doi.org/10.1016/j.amepre.2019.08.034>
- Krueger, R. F. (1999). The structure of common mental disorders. *Archives of General Psychiatry*, 56(10), 921-926. <https://doi.org/10.1001/archpsyc.56.10.921>
- Kruize, H., van Der Vliet, N., Staatsen, B., Bell, R., Chiabai, A., Muiños, G., ... & Stegeman, I. (2019). Urban green space: creating a triple win for environmental sustainability, health, and health equity through behavior change. *International Journal of Environmental Research and Public Health*, 16(22), 4403. <https://doi.org/10.3390/ijerph16224403>
- Kuipers, M. A., Jongeneel-Grimen, B., Droomers, M., Wingen, M., Stronks, K., & Kunst, A. E. (2013). Why residents of Dutch deprived neighbourhoods are less likely to be heavy drinkers: the role of individual and contextual characteristics. *Journal of Epidemiology & Community Health*, 67(7), 587-594. <https://doi.org/10.1136/jech-2012-201242>
- Kuipers, M. A., van Poppel, M. N., van den Brink, W., Wingen, M., & Kunst, A. E. (2012). The association between neighborhood disorder, social cohesion and hazardous alcohol use: a national multilevel study. *Drug and Alcohol Dependence*, 126(1-2), 27-34. <https://doi.org/10.1016/j.drugalcdep.2012.04.008>
- Kusenbach, M. (2003). Street phenomenology: The go-along as ethnographic research tool. *Ethnography*, 4(3), 455-485. <https://doi.org/10.1177/146613810343007>
- Kwan, M. P. (2012). The uncertain geographic context problem. *Annals of the Association of American Geographers*, 102(5), 958-968. <https://doi.org/10.1080/00045608.2012.687349>
- Lagaert, S., Snaphaan, T., Vyncke, V., Hardyns, W., Pauwels, L. J., & Willems, S. (2021). A multilevel perspective on the health effect of social capital: evidence for the relative importance of individual social capital over neighborhood social capital. *International Journal of Environmental Research and Public Health*, 18(4), 1526. <https://doi.org/10.3390/ijerph18041526>
- Lai, H. M. X., Cleary, M., Sitharthan, T., & Hunt, G. E. (2015). Prevalence of comorbid substance use, anxiety and mood disorders in epidemiological surveys, 1990–2014: A systematic review and meta-analysis. *Drug and Alcohol Dependence*, 154, 1-13. <https://doi.org/10.1016/j.drugalcdep.2015.05.031>
- Lahey, B., & Orehek, E. (2011). Relational Regulation Theory: A New Approach to Explain the Link Between Perceived Social Support and Mental Health. *Psychological Review*, 118(3), 482-495. <https://doi.org/10.1037/a0023477>
- Landberg, J., Trolldal, B., & Norström, T. (2021). Is the theory of collectivity of drinking cultures valid across educational groups?. *Drug and Alcohol Review*, 40(3), 472-480. <https://doi.org/10.1111/dar.13232>
- Lardier, D. T., Zuhl, M. N., Holladay, K. R., Amorim, F. T., Heggenberger, R., & Coakley, K. E. (2022). A latent class analysis of mental health severity and alcohol consumption: Associations with COVID-19-related quarantining, isolation, suicidal ideations, and physical activity. *International Journal of Mental Health and Addiction*, 1-24. <https://doi.org/10.1007/s11469-021-00722-9>
- Larm, P., Åslund, C., Starrin, B., & Nilsson, K. W. (2016). How are social capital and sense of coherence associated with hazardous alcohol use? Findings from a large population-based Swedish sample of adults. *Scandinavian Journal of Public Health*, 44(5), 525-533. <https://doi.org/10.1177/1403494816645221>

- Latham, A., & Layton, J. (2019). Social infrastructure and the public life of cities: Studying urban sociality and public spaces. *Geography Compass*, 13(7), e12444. <https://doi.org/10.1111/gec3.12444>
- Lawry, T. (2022, June). Genetic code vs. zip code: The social determinants of health. *Forbes*. Available at: <https://www.forbes.com/sites/forbestechcouncil/2024/06/12/18-best-practices-for-optimizing-ai-and-cloud-computing-efficiency/> (Accessed 12 June 2024)
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.
- Lê, F., Ahern, J., & Galea, S. (2010). Neighborhood education inequality and drinking behavior. *Drug and Alcohol Dependence*, 112(1-2), 18-26. <https://doi.org/10.1016/j.drugalcdep.2010.05.005>
- Lee, J. O., Hill, K. G., Hartigan, L. A., Boden, J. M., Guttmanova, K., Kosterman, R., ... & Catalano, R. F. (2015). Unemployment and substance use problems among young adults: Does childhood low socioeconomic status exacerbate the effect?. *Social Science & Medicine*, 143, 36-44. <https://doi.org/10.1016/j.socscimed.2015.08.016>
- Lee, M. R., & Sher, K. J. (2018). "Maturing out" of binge and problem drinking. *Alcohol Research: Current Reviews*, 39(1), 31-42.
- Leigh-Hunt, N., Bagguley, D., Bash, K., Turner, V., Turnbull, S., Valtorta, N., & Caan, W. (2017). An overview of systematic reviews on the public health consequences of social isolation and loneliness. *Public Health*, 152, 157-171. <https://doi.org/10.1016/j.puhe.2017.07.035>
- Lekkas, P., Stankov, I., Daniel, M., & Paquet, C. (2019). Finite mixture models in neighbourhoods-to-health research: A systematic review. *Health & Place*, 59, 102140. <https://doi.org/10.1016/j.healthplace.2019.05.018>
- Lembke, A. (2012). Time to abandon the self-medication hypothesis in patients with psychiatric disorders. *The American Journal of Drug and Alcohol Abuse*, 38(6), 524-529. <https://doi.org/10.3109/00952990.2012.694532>
- Lewer, D., Meier, P., Beard, E., Boniface, S., & Kaner, E. (2016). Unravelling the alcohol harm paradox: a population-based study of social gradients across very heavy drinking thresholds. *BMC Public Health*, 16, 1-11. <https://doi.org/10.1186/s12889-016-3265-9>
- Li, Y., Savage, M., & Warde, A. (2008). Social mobility and social capital in contemporary Britain. *British Journal of Sociology*, 59(3), 391-411. <https://doi.org/10.1111/j.1468-4446.2008.00200.x>
- Lin, E.-Y., Witten, K., Casswell, S., & You, R. Q. (2012). Neighbourhood matters: perceptions of neighbourhood cohesiveness and associations with alcohol, cannabis and tobacco use. *Drug and Alcohol Review*, 31(4), 402-412. <https://doi.org/10.1111/j.1465-3362.2011.00385.x>
- Lindström, M. (2003). Social capital and the miniaturization of community among daily and intermittent smokers: A population-based study. *Preventive Medicine*, 36(2), 177-184. [https://doi.org/10.1016/S0091-7435\(02\)00049-X](https://doi.org/10.1016/S0091-7435(02)00049-X)
- Lindström, M. (2005). Social capital, the miniaturisation of community and consumption of homemade liquor and smuggled liquor during the past year: A population-based study. *The European Journal of Public Health*, 15(6), 593-600. <https://doi.org/10.1093/eurpub/cki056>
- Lindström, M. (2005a). Social capital, the miniaturization of community and high alcohol consumption: a population-based study. *Alcohol and Alcoholism*, 40(6), 556-562. <https://doi.org/10.1093/alcalc/agh190>
- Lindström, M. (2010). Social capital, economic conditions, marital status and daily smoking: A population-based study. *Public Health*, 124(2), 71-77. <https://doi.org/https://doi.org/10.1016/j.puhe.2010.01.003>
- Lindström, M., & Mohseni, M. (2009). Social capital, political trust and self-reported psychological health: A population-based study. *Social Science & Medicine*, 68(3), 436-443. <https://doi.org/10.1016/j.socscimed.2008.11.004>
- Lindström, M., Pirouzifard, M., & Rosvall, M. (2021). Social capital, the miniaturization of community, traditionalism and mortality: A population-based prospective cohort study

- in southern Sweden [Article]. *Ssm-Population Health*, 16, 10, Article 100956. <https://doi.org/10.1016/j.ssmph.2021.100956>
- Link, B. G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. *Journal of Health and Social Behavior*, 80-94. <https://doi.org/10.2307/2626958>
- Liu, Y., Wang, R., Lu, Y., Li, Z., Chen, H., Cao, M., ... & Song, Y. (2020). Natural outdoor environment, neighbourhood social cohesion and mental health: Using multilevel structural equation modelling, streetscape and remote-sensing metrics. *Urban Forestry & Urban Greening*, 48, 126576. <https://doi.org/10.1016/j.ufug.2019.126576>
- Liverpool City Council. (2019). *The Index of Multiple Deprivation 2019: A Liverpool analysis*. <https://liverpool.gov.uk/media/ihtag3er/imd-2019-liverpool-analysis-main-report.pdf>
- Liverpool City Council. (2020, March). *The Index of Multiple Deprivation 2019: A Liverpool analysis. Appendix B – Liverpool ward analysis*. Liverpool City Council. Available at: <https://liverpool.gov.uk/council/key-statistics-and-data/indices-of-deprivation/> (Accessed 12 June 2024)
- Lofors, J., & Sundquist, K. (2007). Low-linking social capital as a predictor of mental disorders: a cohort study of 4.5 million Swedes. *Social Science & Medicine*, 64(1), 21-34. <https://doi.org/10.1016/j.socscimed.2006.08.024>
- Long, F. C., & Jepsen, K. S. (2023). Situating stigma: an ethnographic exploration of how stigma arises in interactions at different stages of people's drug use journeys. *International Journal of Environmental Research and Public Health*, 20(19), 6894. <https://doi.org/10.3390/ijerph20196894>
- Lonsdale, A. J., Hardcastle, S. J., & Hagger, M. S. (2012). A minimum price per unit of alcohol: a focus group study to investigate public opinion concerning UK government proposals to introduce new price controls to curb alcohol consumption. *BMC Public Health*, 12, 1-16. <https://doi.org/10.1186/1471-2458-12-1023>
- Lorenc, T., Petticrew, M., Whitehead, M., Neary, D., Clayton, S., Wright, K., ... & Renton, A. (2014). Crime Fear of Crime and Mental Health: Synthesis of Theory and Systematic Reviews of Interventions and Qualitative Evidence. *Public Health Research*, 2(2), 1-398. <https://doi.org/10.3310/phr02020>
- Loy, J. K., Seitz, N. N., Bye, E. K., Raitasalo, K., Soellner, R., Törrönen, J., & Kraus, L. (2021). Trends in alcohol consumption among adolescents in Europe: Do changes occur in concert?. *Drug and Alcohol Dependence*, 228, 109020.
- Lu, N., & Peng, C. (2019). Community-based structural social capital and depressive symptoms of older urban Chinese adults: The mediating role of cognitive social capital. *Archives of Gerontology and Geriatrics*, 82, 74-80. <https://doi.org/10.1016/j.archger.2019.01.014>
- Luca, N. R., Hibbert, S., & McDonald, R. (2019). Understanding behaviour change in context: Examining the role of midstream social marketing programmes. *Sociology of Health & Illness*, 41(7), 1373-1395. <https://doi.org/10.1111/1467-9566.12951>
- Lunnay, B., Nicholls, E., Pennay, A., MacLean, S., Wilson, C., Meyer, S. B., ... & Ward, P. R. (2022). Sober curiosity: a qualitative study exploring women's preparedness to reduce alcohol by social class. *International Journal of Environmental Research and Public Health*, 19(22), 14788. <https://doi.org/10.3390/ijerph192214788>
- Lynn, P. (2009) Sample Design for Understanding Society, Understanding Society Working Paper Series No. 2009 – 01. Institute for Social and Economic Research, University of Essex. Available at: <https://www.understandingsociety.ac.uk/research/publications/publication-514007/%20> (Accessed 18 July 2024)
- Lynn, P., Burton, J., Kaminska, O., Knies, G. and Nandi, A. (2012) An initial look at nonresponse and attrition in Understanding Society. Understanding Society Working Paper 2012-02. Colchester: University of Essex
- Lynn, P., Nandi, A., Parutis, V., & Platt, L. (2018). Design and implementation of a high-quality probability sample of immigrants and ethnic minorities: Lessons learnt. *Demographic Research*, 38, 513-548. <https://doi.org/10.4054/DemRes.2018.38.21>

- MacArthur, G. J., Jacob, N., Pound, P., Hickman, M., & Campbell, R. (2017). Among friends: a qualitative exploration of the role of peers in young people's alcohol use using Bourdieu's concepts of habitus, field and capital. *Sociology of Health & Illness*, 39(1), 30-46. <https://doi.org/10.1111/1467-9566.12467>
- Mackinnon, S. P., Couture, M. E., Cooper, M. L., Kuntsche, E., O'Connor, R. M., Stewart, S. H., & DRINC Team. (2017). Cross-cultural comparisons of drinking motives in 10 countries: Data from the DRINC project. *Drug and Alcohol Review*, 36(6), 721-730. <https://doi.org/10.1111/dar.12464>
- MacQueen, K. M., McLellan, E., Metzger, D. S., Kegeles, S., Strauss, R. P., Scotti, R., ... & Trotter, R. T. (2001). What is community? An evidence-based definition for participatory public health. *American Journal of Public Health*, 91(12), 1929-1938. <https://doi.org/10.2105/AJPH.91.12.1929>
- Magson, N. R., Craven, R. G., Munns, G., & Yeung, A. S. (2016). It is risky business: can social capital reduce risk-taking behaviours among disadvantaged youth?. *Journal of Youth Studies*, 19(5), 569-592. <https://doi.org/10.1080/13676261.2015.1098776>
- Maimon, D., & Browning, C. R. (2012). Underage drinking, alcohol sales and collective efficacy: Informal control and opportunity in the study of alcohol use. *Social Science Research*, 41(4), 977-990. <https://doi.org/10.1016/j.ssresearch.2012.01.009>
- Mann, K., Aubin, H. J., & Witkiewitz, K. (2017). Reduced drinking in alcohol dependence treatment, what is the evidence?. *European Addiction Research*, 23(5), 219-230. <https://doi.org/10.1159/000481348>
- Manthey, J., Hassan, S. A., Carr, S., Kilian, C., Kuitunen-Paul, S., & Rehm, J. (2021). What are the economic costs to society attributable to alcohol use? A systematic review and modelling study. *Pharmacoeconomics*, 39(7), 809-822. <https://doi.org/10.1007/s40273-021-01031-8>
- Manthey, J., Shield, K. D., Rylett, M., Hasan, O. S., Probst, C., & Rehm, J. (2019). Global alcohol exposure between 1990 and 2017 and forecasts until 2030: a modelling study. *The Lancet*, 393(10190), 2493-2502. [https://doi.org/10.1016/S0140-6736\(18\)32744-2](https://doi.org/10.1016/S0140-6736(18)32744-2)
- Manton, E., Pennay, A., & Savic, M. (2014). Public drinking, social connection and social capital: A qualitative study. *Addiction Research & Theory*, 22(3), 218-228. <https://doi.org/https://doi.org/10.3109/16066359.2013.812202>
- Marmot, M. G., Rose, G., Shipley, M., & Hamilton, P. J. (1978). Employment grade and coronary heart disease in British civil servants. *Journal of Epidemiology & Community Health*, 32(4), 244-249. <https://doi.org/10.1136/jech.32.4.244>
- Marmot, M. G., Smith, G. D., Stansfeld, S., Patel, C., North, F., Head, J., ... & Feeney, A. (2013). Health inequalities among British civil servants: the Whitehall II study. In *Stress and the Brain* (pp. 61-67). Routledge.
- Marmot, M. G., Smith, G. D., Stansfeld, S., Patel, C., North, F., Head, J., ... & Feeney, A. (1991). Health inequalities among British civil servants: The Whitehall II study. *Lancet*, 337, 1387-93. [https://doi.org/10.1016/0140-6736\(91\)93068-K](https://doi.org/10.1016/0140-6736(91)93068-K)
- Marshall, M. N. (1996). The key informant technique. *Family Practice*, 13, 92-97. <https://doi.org/10.1093/fampra/13.1.92>
- Martin, G., Inchley, J., & Currie, C. (2019). Do drinking motives mediate the relationship between neighborhood characteristics and alcohol use among adolescents?. *International Journal of Environmental Research and Public Health*, 16(5), 853. <https://doi.org/10.3390/ijerph16050853>
- Martinez, S. A., Beebe, L. A., Thompson, D. M., Wagener, T. L., Terrell, D. R., & Campbell, J. E. (2018). A structural equation modeling approach to understanding pathways that connect socioeconomic status and smoking. *PLoS ONE*, 13(2), 17. <https://doi.org/https://doi.org/10.1371/journal.pone.0192451>
- Martins, J. G., de Paiva, H. N., Paiva, P. C. P., Ferreira, R. C., Pordeus, I. A., Zarzar, P. M., & Kawachi, I. (2017). New evidence about the “dark side” of social cohesion in promoting binge drinking among adolescents. *PloS one*, 12(6), e0178652. <https://doi.org/10.1371/journal.pone.0178652>

- Martin-Storey, A., Ruttle, P. L., Temcheff, C. E., Serbin, L. A., Stack, D. M., Ledingham, J. E., & Schwartzman, A. E. (2013). Longitudinal and concurrent pathways to alcoholism: The importance of perception of neighborhood disorder. *Journal of Community Psychology*, 41(2), 156-174. <https://doi.org/10.1002/jcop.21520>
- Maruthaveeran, S., & van den Bosch, C. C. K. (2014). A socio-ecological exploration of fear of crime in urban green spaces—A systematic review. *Urban Forestry & Urban Greening*, 13(1), 1-18. <https://doi.org/10.1016/j.ufug.2013.11.006>
- May, C., Nielsen, A. S., & Bilberg, R. (2019). Barriers to treatment for alcohol dependence. *Journal of Drug and Alcohol Research*, 8(236083). <https://doi.org/10.4303/jdar/236083>
- Mayne, S. L., Auchincloss, A. H., Moore, K. A., Michael, Y. L., Tabb, L. P., Echeverria, S. E., & Diez Roux, A. V. (2017). Cross-sectional and longitudinal associations of neighbourhood social environment and smoking behaviour: the multiethnic study of atherosclerosis. *Journal of Epidemiology and Community Health*, 71(4), 396-403. <https://doi.org/10.1136/jech-2016-207990>
- Mazumdar, S., Learnihan, V., Cochrane, T., & Davey, R. (2018). The built environment and social capital: A systematic review. *Environment and Behavior*, 50(2), 119-158. <https://doi.org/10.1177/0013916516687343>
- McAnaney, H., Tully, M. A., Hunter, R. F., Kouvonen, A., Veal, P., Stevenson, M., & Kee, F. (2015). Individual factors and perceived community characteristics in relation to mental health and mental well-being. *BMC Public Health*, 15, 1-13. <https://doi.org/10.1186/s12889-015-2590-8>
- McCambridge, J., & Lesch, M. (2024). Are we moving into a new era for alcohol policy globally? An analysis of the Global Alcohol Action Plan 2022-30. *BMJ Global Health*, 9(2), e014246. <https://doi.org/10.1136/bmjgh-2023-014246>
- McCartney, G., Russ, T. C., Walsh, D., Lewsey, J., Smith, M., Smith, G. D., ... & Batty, G. D. (2015). Explaining the excess mortality in Scotland compared with England: pooling of 18 cohort studies. *Journal of Epidemiology & Community Health*, 69(1), 20-27. <https://doi.org/10.1136/jech-2014-204185>
- McEwen, B. S. (1998). Stress, adaptation, and disease: Allostasis and allostatic load. *Annals of the New York Academy of Sciences*, 840(1), 33-44. <https://doi.org/10.1111/j.1749-6632.1998.tb09546.x>
- McGrath, M., Reynolds, J., Smolar, M., Hare, S., Ogden, M., Popay, J., ... & Egan, M. (2019). Identifying opportunities for engaging the 'community' in local alcohol decision-making: a literature review and synthesis. *International Journal of Drug Policy*, 74, 193-204. <https://doi.org/10.1016/j.drugpo.2019.09.020>
- McKay, M. T., Andretta, J. R., Magee, J., & Worrell, F. C. (2014). What do temporal profiles tell us about adolescent alcohol use? Results from a large sample in the United Kingdom. *Journal of Adolescence*, 37(8), 1319-1328. <https://doi.org/10.1016/j.adolescence.2014.09.008>
- McKenzie, K., Whitley, R., & Weich, S. (2002). Social capital and mental health. *The British Journal of Psychiatry*, 181(4), 280-283. <https://doi.org/10.1192/bjp.181.4.280>
- McLafferty, S. (2015). Disease cluster detection methods: recent developments and public health implications. *Annals of GIS*, 21(2), 127-133. <https://doi.org/10.1080/19475683.2015.1008572>
- McLean, C. P., Asnaani, A., Litz, B. T., & Hofmann, S. G. (2011). Gender differences in anxiety disorders: prevalence, course of illness, comorbidity and burden of illness. *Journal of Psychiatric Research*, 45(8), 1027-1035. <https://doi.org/10.1016/j.jpsychires.2011.03.006>
- McLeish, A. C., Walker, K. L., Keith, R. J., & Hart, J. L. (2023). The role of perceived neighborhood cohesion in the association between depressive symptoms and cigarette smoking. *Substance Use & Misuse*, 58(10), 1295-1301. <https://doi.org/https://doi.org/10.1080/10826084.2023.2215331>

- McMahon, N. E. (2022). Framing action to reduce health inequalities: what is argued for through use of the 'upstream–downstream' metaphor?. *Journal of Public Health*, 44(3), 671-678. <https://doi.org/10.1093/pubmed/fdab157>
- McManus, S., Bebbington, P., Jenkins, R., & Brugha, T. (Eds.). (2016). *Mental health and wellbeing in England: Adult Psychiatric Morbidity Survey 2014*. NHS Digital. <https://assets.publishing.service.gov.uk/media/5a802e2fe5274a2e8ab4ea71/apms-2014-full-rpt.pdf> (Accessed June 12, 2024)
- Mekonen, T., Chan, G. C., Connor, J., Hall, W., Hides, L., & Leung, J. (2021). Treatment rates for alcohol use disorders: a systematic review and meta-analysis. *Addiction*, 116(10), 2617-2634. <https://doi.org/10.1111/add.15357>
- Menard, S., & Morris, R. G. (2012). Integrated theory and crimes of trust. *Journal of Quantitative Criminology*, 28(2), 365-387. <https://doi.org/https://doi.org/10.1007/s10940-011-9142-x>
- Mericle, A. A., Kaskutas, L. A., Polcin, D. L., & Karriker-Jaffe, K. J. (2018). Independent and interactive effects of neighborhood disadvantage and social network characteristics on problem drinking after treatment. *Journal of Social and Clinical Psychology*, 37(1), 1-21. <https://doi.org/10.1521/jscp.2018.37.1.1>
- Merlo, J., Chaix, B., Yang, M., Lynch, J., & Råstam, L. (2005). A brief conceptual tutorial of multilevel analysis in social epidemiology: linking the statistical concept of clustering to the idea of contextual phenomenon. *Journal of Epidemiology & Community Health*, 59(6), 443-449. <https://doi.org/10.1136/jech.2004.023473>
- Mezquita, L., Stewart, S. H., Ibáñez, M. I., Ruipérez, M. A., Villa, H., Moya, J., & Ortet, G. (2011). Drinking motives in clinical and general populations. *European Addiction Research*, 17(5), 250-261. <https://doi.org/10.1159/000328510>
- Miller, P. G., & Droste, N. (2013). Alcohol price considerations on alcohol and Illicit drug use in university students. *Journal of Alcoholism and Drug Dependence*, 1(2), 1-4. <https://doi.org/10.4172/jaldd.1000109>
- Ministry of Housing, Communities & Local Government. (2019). *The English indices of deprivation 2019* (IoD2019). https://assets.publishing.service.gov.uk/media/5d8e26f6ed915d5570c6cc55/IoD2019_Statistical_Release.pdf
- Minkler, M. (2005). Community-based research partnerships: challenges and opportunities. *Journal of Urban Health*, 82, ii3-ii12. <https://doi.org/10.1093/jurban/jti034>
- Modesti, P. A., Reboldi, G., Cappuccio, F. P., Agyemang, C., Remuzzi, G., Rapi, S., ... & ESH Working Group on CV Risk in Low Resource Settings. (2016). Panethnic differences in blood pressure in Europe: a systematic review and meta-analysis. *PloS one*, 11(1), e0147601. <https://doi.org/10.1371/journal.pone.0147601>
- Mohnen, S. M., Völker, B., Flap, H., & Groenewegen, P. P. (2012). Health-related behavior as a mechanism behind the relationship between neighborhood social capital and individual health--a multilevel analysis. *BMC public health*, 12, 116. <https://doi.org/10.1186/1471-2458-12-116>
- Mojtabai, R., Chen, L. Y., Kaufmann, C. N., & Crum, R. M. (2014). Comparing barriers to mental health treatment and substance use disorder treatment among individuals with comorbid major depression and substance use disorders. *Journal of Substance Abuse Treatment*, 46(2), 268-273. <https://doi.org/10.1016/j.jsat.2013.07.012>
- Molina-de la Fuente, I. M. D. L., Pastor, A., Conde, P., Vázquez, M. S., Ramos, C., Bosque-Prous, M., ... & Sureda, X. (2021). Changes in perceptions of the alcohol environment among participants in a Photovoice project conducted in two districts with different socio-economic status. *Plos one*, 16(8), e0254978. <https://doi.org/10.1371/journal.pone.0254978>
- Molina-de la Fuente, I., Pastor, A., Conde, P., Vázquez, M. S., Ramos, C., Bosque-Prous, M., ... & Sureda, X. (2021). Residents perceptions of the alcohol environment: A participatory photovoice project in two districts with different socio-economic status in

- a large city. *Health & Place*, 69, 102566. <https://doi.org/10.1016/j.healthplace.2021.102566>
- Momtaz, Y. A., Haron, S. A., Ibrahim, R., & Hamid, T. A. (2014). Social embeddedness as a mechanism for linking social cohesion to well-being among older adults: moderating effect of gender. *Clinical Interventions in Aging*, 863-870. <https://doi.org/10.2147/CIA.S62205>
- Moore, K. A., Hirsch, J. A., August, C., Mair, C., Sanchez, B. N., & Roux, A. V. D. (2016). Neighborhood social resources and depressive symptoms: longitudinal results from the multi-ethnic study of atherosclerosis. *Journal of Urban Health*, 93, 572-588. <https://doi.org/10.1007/s11524-016-0042-0>
- Moore, S., & Kawachi, I. (2017). Twenty years of social capital and health research: a glossary. *Journal of Epidemiology & Community Health*, 71(5), 513-517. <https://doi.org/10.1136/jech-2016-208313>
- Moos, R. H., & Moos, B. S. (2006). Rates and predictors of relapse after natural and treated remission from alcohol use disorders. *Addiction*, 101(2), 212-222. <https://doi.org/10.1111/j.1360-0443.2006.01310.x>
- Morgan, A., & Ziglio, E. (2007). Revitalising the evidence base for public health: an assets model. *Promotion & Education*, 14(Suppl2), 17-22. <https://doi.org/10.1177/10253823070140020701x>
- Morgan, D. L. (1998). Practical strategies for combining qualitative and quantitative methods: Applications to health research. *Qualitative Health Research*, 8(3), 362-376. <https://doi.org/10.1177/104973239800800307>
- Morris, J., Cox, S., Moss, A. C., & Reavey, P. (2023). Drinkers like us? The availability of relatable drinking reduction narratives for people with alcohol use disorders. *Addiction Research & Theory*, 31(1), 1-8. <https://doi.org/10.1080/16066359.2022.2099544>
- Morris, J., Moss, A. C., Albery, I. P., & Heather, N. (2022). The “alcoholic other”: Harmful drinkers resist problem recognition to manage identity threat. *Addictive Behaviors*, 124, 107093. <https://doi.org/10.1016/j.addbeh.2021.107093>
- Morse, N., Thomson, L. J. M., Brown, Z., & Chatterjee, H. J. (2015). Effects of creative museum outreach sessions on measures of confidence, sociability and well-being for mental health and addiction recovery service-users. *Arts & Health: An International Journal for Research, Policy and Practice*, 7(3), 231-246. <https://doi.org/https://doi.org/10.1080/17533015.2015.1061570>
- Morton, S., O'Reilly, L., & O'Brien, K. (2016). Boxing clever: utilizing education and fitness to build recovery capital in a substance use rehabilitation program. *Journal of Substance Use*, 21(5), 521-526. <https://doi.org/10.3109/14659891.2015.1077281>
- Moskowitz, D., Vittinghoff, E., & Schmidt, L. (2013). Reconsidering the effects of poverty and social support on health: a 5-year longitudinal test of the stress-buffering hypothesis. *Journal of Urban Health*, 90, 175-184. <https://doi.org/10.1007/s11524-012-9757-8>
- Moss, H. B., Chen, C. M., & Yi, H. Y. (2007). Subtypes of alcohol dependence in a nationally representative sample. *Drug and Alcohol Dependence*, 91(2-3), 149-158. <https://doi.org/10.1016/j.drugalcdep.2007.05.016>
- Muckenhuber, J., Stronegger, W. J., & Freidl, W. (2013). Social capital affects the health of older people more strongly than that of younger people. *Ageing & Society*, 33(5), 853-870. <https://doi.org/10.1017/S0144686X12000219>
- Müller, M., Ajdacic-Gross, V., Vetrella, A. B., Preisig, M., Castela, E., Lasserre, A., ... & Vandeley, C. (2020). Subtypes of alcohol use disorder in the general population: A latent class analysis. *Psychiatry Research*, 285, 112712. <https://doi.org/10.1016/j.psychres.2019.112712>
- Murphy, A., Roberts, B., Kenward, M. G., De Stavola, B. L., Stickley, A., & McKee, M. (2014). Using multi-level data to estimate the effect of social capital on hazardous alcohol consumption in the former Soviet Union. *European Journal of Public Health*, 24(4), 572-577. <https://doi.org/10.1093/eurpub/ckt213>

- Murray, C. J., Aravkin, A. Y., Zheng, P., Abbafati, C., Abbas, K. M., Abbasi-Kangevari, M., ... & Borzouei, S. (2020). Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, 396(10258), 1223–1249. [https://doi.org/10.1016/S0140-6736\(20\)30752-2](https://doi.org/10.1016/S0140-6736(20)30752-2)
- Nagin, D. S. (1999). Analyzing developmental trajectories: A semiparametric, group-based approach. *Psychological Methods*, 4(2), 139–157. <https://doi.org/10.1037/1082-989X.4.2.139>
- Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23(2), 242–266. <https://doi.org/10.5465/amr.1998.533225>
- Namkoong, K., Nah, S., Van Stee, S. K., & Record, R. A. (2018). Social Media Campaign Effects: Moderating Role of Social Capital in an Anti-Smoking Campaign. *Health Communication*, 33(3), 274–283. <https://doi.org/10.1080/10410236.2016.1258616>
- National Institute for Health and Care Excellence. (2017). *Alcohol-use disorders: diagnosis and management of physical complications* (NICE Guideline No.CG100). Available at: <https://www.nice.org.uk/guidance/cg100> (Accessed 12 June 2024)
- National Institute on Alcohol Abuse and Alcoholism. (2023). *Drinking levels defined*. Available at: <https://www.niaaa.nih.gov/alcohol-health/overview-alcohol-consumption/moderate-binge-drinking> (Accessed 12 June 2024)
- National Institute on Alcohol Abuse and Alcoholism. (2024). *Understanding alcohol use disorder*. Available at: <https://www.niaaa.nih.gov/publications/brochures-and-fact-sheets/understanding-alcohol-use-disorder#:~:text=A%20person's%20risk%20for%20developing,increases%20the%20risk%20of%20AUD> (Accessed 12 June 2024)
- National Institute on Drug Abuse. (2011, July). *Treatment and recovery*. Available at: <https://nida.nih.gov/publications/drugs-brains-behavior-science-addiction/treatment-recovery> (Accessed 12 June 2024)
- Neale, J., & Brown, C. (2016). 'We are always in some form of contact': friendships among homeless drug and alcohol users living in hostels. *Health & Social Care in the Community*, 24(5), 557–566. <https://doi.org/10.1111/hsc.12215>
- Neally, S. J., Tamura, K., Langerman, S. D., Claudel, S. E., Farmer, N., Vijayakumar, N. P., ... & Powell-Wiley, T. M. (2022). Associations between neighborhood socioeconomic deprivation and severity of depression: Data from the National Health and Nutrition Examination Survey, 2011–2014. *SSM-Population Health*, 18, 101111. <https://doi.org/10.1016/j.ssmph.2022.101111>
- Neville, F. G., Templeton, A., Smith, J. R., & Louis, W. R. (2021). Social norms, social identities and the COVID-19 pandemic: Theory and recommendations. *Social and Personality Psychology Compass*, 15(5), e12596. <https://doi.org/10.1111/spc3.12596>
- Ng Fat, L., Scholes, S., & Jivraj, S. (2017). The Relationship Between Drinking Pattern, Social Capital, and Area-Deprivation: Findings From the Health Survey for England. *Journal of Studies on Alcohol and Drugs*, 78(1), 20–29. <https://doi.org/10.15288/jsad.2017.78.20>
- NHS Digital. (2020a, December 15). *Health Survey for England 2019 Adults' health-related behaviours*. Available at: <https://digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/2019> (Accessed 18 July 2024)
- NHS Digital. (2020b). *Statistics on Alcohol, England 2020*. Available at: <https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-alcohol/2020> (Accessed 12 June 2024)
- NHS Digital. (2022). *Health Survey for England, 2021 part 1*. Available at: <https://digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/2021/part-3-drinking-alcohol> (Accessed 12 June 2024)

- NHS England. (2016). Implementing the Five Year Forward View for Mental Health. Available at: <https://www.england.nhs.uk/wp-content/uploads/2016/07/fyfv-mh.pdf> (Accessed 12 June 2024)
- Nie, X., Zhu, Y., Fu, H., Dai, J., & Gao, J. (2018). The “dark side” effects of social capital on harmful drinking among Chinese community residents: A multilevel study. *International Journal of Environmental Research and Public Health*, 15(10), 2249. <https://doi.org/10.3390/ijerph15102249>
- Niedzwiedz, C. L., Green, M. J., Benzeval, M., Campbell, D., Craig, P., Demou, E., ... & Katikireddi, S. V. (2021). Mental health and health behaviours before and during the initial phase of the COVID-19 lockdown: longitudinal analyses of the UK Household Longitudinal Study. *Journal of Epidemiology & Community Health*, 75(3), 224-231. <https://doi.org/10.1136/jech-2020-215060>
- Nieminen, T., Prättälä, R., Martelin, T., Härkänen, T., Hyypä, M. T., Alanen, E., & Koskinen, S. (2013). Social capital, health behaviours and health: a population-based associational study. *BMC public health*, 13, 613. <https://doi.org/10.1186/1471-2458-13-613>
- Noblit, G. W., & Hare, R. D. (1988). *Meta-ethnography: Synthesizing qualitative studies* (Vol. 11). Sage.
- Nordmyr, J., Forsman, A. K., & Österman, K. (2016). Problematic alcohol use and problem gambling: Associations to structural and functional aspects of social ties in a Finnish population sample. *Nordic Studies on Alcohol and Drugs*, 33(4), 381-398. <https://doi.org/10.1515/nsad-2016-0032>
- Nurture Development. (2018). Assets-based community development (ABCD). <https://www.nurturedevelopment.org/asset-based-community-development/> (Accessed 12 June 2024)
- Nykiforuk, C. I., Vallianatos, H., & Nieuwendyk, L. M. (2011). Photovoice as a method for revealing community perceptions of the built and social environment. *International Journal of Qualitative Methods*, 10(2), 103-124. <https://doi.org/10.1177/160940691101000201>
- O'Campo, P., Salmon, C., & Burke, J. (2009). Neighbourhoods and mental well-being: what are the pathways?. *Health & Place*, 15(1), 56-68. <https://doi.org/10.1016/j.healthplace.2008.02.004>
- Oberndorfer, M., Dorner, T. E., Leyland, A. H., Grabovac, I., Schober, T., Šramek, L., & Bilger, M. (2022). The challenges of measuring social cohesion in public health research: a systematic review and econometric meta-analysis. *SSM-Population Health*, 17, 101028. <https://doi.org/10.1016/j.ssmph.2022.101028>
- O'Brien, D. T., Farrell, C., & Welsh, B. C. (2019). Broken (windows) theory: A meta-analysis of the evidence for the pathways from neighborhood disorder to resident health outcomes and behaviors [Review]. *Social Science & Medicine*, 228, 272-292. <https://doi.org/10.1016/j.socscimed.2018.11.015>
- O'Donnell, J., Cárdenas, D., Orazani, N., Evans, A., & Reynolds, K. J. (2022). The longitudinal effect of COVID-19 infections and lockdown on mental health and the protective effect of neighbourhood social relations. *Social Science & Medicine*, 297, 114821. <https://doi.org/10.1016/j.socscimed.2022.114821>
- OECD. (2011). Perspectives on Global Development 2012: Social Cohesion in a Shifting World. OECD Publishing. http://dx.doi.org/10.1787/persp_glob_dev-2012-en Available at: <https://www.socialcohesion.info/library/publication/perspectives-on-global-development-2012-social-cohesion-in-a-shifting-world-1> (Accessed 18 July 2024)
- Office for Health Improvement & Disparities. (2021, November 25). *Adult substance misuse treatment statistics 2020 to 2021: report*. Available at: <https://www.gov.uk/government/statistics/substance-misuse-treatment-for-adults-statistics-2020-to-2021/adult-substance-misuse-treatment-statistics-2020-to-2021-report#mental-health> (Accessed 12 June 2024)
- Office for Health Improvement & Disparities. (2024, March 14). Estimates of alcohol dependent adults in England: summary. Available at:

- <https://www.gov.uk/government/publications/alcohol-dependence-prevalence-in-england/estimates-of-alcohol-dependent-adults-in-england-summary#:~:text=National%20estimates,-These%20estimates%20of&text=There%20were%20an%20estimated%20608%2C416,than%20in%202018%20to%202019> (Accessed 18 July 2024)
- Office for National Statistics. (2017). Social capital in the UK: May 2017. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/bulletins/socialcapitalintheuk/may2017>
- Office for National Statistics. (2018, May 1). *Adult drinking habits in Great Britain: 2017*. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/drugusealcoholandsmoking/bulletins/opinionsandlifestylesurveyadultdrinkinghabitsingreatbritain/2017> (Accessed 18 July 2024)
- Office for National Statistics. (2020). Social capital in the UK: 2020. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/bulletins/socialcapitalintheuk/2020>
- Office for National Statistics. (2021). *Coronavirus and compliance with government guidance, UK: April 2021*. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/coronavirusandcompliancewithgovernmentguidanceuk/april2021> (Accessed 12 June 2024)
- Office for National Statistics. (2022). Social capital in the UK: April 2020 to March 2021. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/bulletins/socialcapitalintheuk/april2020tomarch2021>
- Office for National Statistics. (2023). How your area has changed in 10 years: Census 2021. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/howyourareahaschangedin10yearscensus2021/2022-11-08> (Accessed 12 June 2024)
- Office for National Statistics. (2024). Crime in England and Wales: Police force area data tables, year ending December 2023 edition of this dataset. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/datasets/policeforceareadatatables> (Accessed 12 June 2024)
- Ohly, H., White, M. P., Wheeler, B. W., Bethel, A., Ukoumunne, O. C., Nikolaou, V., & Garside, R. (2016). Attention Restoration Theory: A systematic review of the attention restoration potential of exposure to natural environments. *Journal of Toxicology and Environmental Health, Part B*, 19(7), 305-343. <https://doi.org/10.1080/10937404.2016.1196155>
- Okulicz-Kozaryn, A., & Valente, R. R. (2022). Misanthropolis: Do cities promote misanthropy?. *Cities*, 131, 103945. <https://doi.org/10.1016/j.cities.2022.103945>
- Oleski, J., Mota, N., Cox, B. J., & Sareen, J. (2010). Perceived need for care, help seeking, and perceived barriers to care for alcohol use disorders in a national sample. *Psychiatric Services*, 61(12), 1223-1231. <https://doi.org/10.1176/ps.2010.61.12.1223>
- Onwuegbuzie, A. J., & Johnson, R. B. (2006). The validity issue in mixed research. *Research in the Schools*, 13(1), 48-63.
- Onwuegbuzie, A. J., Johnson, R. B., & Collins, K. M. (2011). Assessing legitimization in mixed research: a new framework. *Quality & Quantity*, 45, 1253-1271. <https://doi.org/10.1007/s11135-009-9289-9>
- Orazani, S. N., Reynolds, K. J., & Osborne, H. (2023). What works and why in interventions to strengthen social cohesion: a systematic review. *Journal of Applied Social Psychology*, 53(10), 938-995. <https://doi.org/10.1111/jasp.12990>
- Pabayo, R., Grinshteyn, E., Avila, O., Azrael, D., & Molnar, B. E. (2020). Relation between neighborhood socio-economic characteristics and social cohesion, social control, and

- collective efficacy: Findings from the Boston Neighborhood Study. *SSM-Population Health*, 10, 100552. <https://doi.org/10.1016/j.ssmph.2020.100552>
- Pacek, L. R., Martins, S. S., & Crum, R. M. (2013). The bidirectional relationships between alcohol, cannabis, co-occurring alcohol and cannabis use disorders with major depressive disorder: results from a national sample. *Journal of Affective Disorders*, 148(2-3), 188-195. <https://doi.org/10.1016/j.jad.2012.11.059>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*, 372. <https://doi.org/10.1136/bmj.n71>
- Pai, M., & Kim, J. (2017). Neighborhood physical disorder and psychological distress: Does the risk increase with age?. *The International Journal of Aging and Human Development*, 84(4), 378-402. <https://doi.org/10.1177/0091415016680068>
- Palis, H., Marchand, K., & Oviedo-Joekes, E. (2020). The relationship between sense of community belonging and self-rated mental health among Canadians with mental or substance use disorders [Article]. *Journal of Mental Health*, 29(2), 168-175. <https://doi.org/10.1080/09638237.2018.1437602>
- Paljärvi, T., Suominen, S., Koskenvuo, M., Winter, T., & Kauhanen, J. (2009). The differences in drinking patterns between Finnish-speaking majority and Swedish-speaking minority in Finland. *European Journal of Public Health*, 19(3), 278-284. <https://doi.org/10.1093/eurpub/ckp007>
- Palombi, L. C., Irish, A., Bowen, E. A., Kosobuski, L., Chen, N. S.-Y., Hawthorne, A. N., & Becher, E. (2022). 'That's got me to where I am today': Examining the role of social capital in rural recovery. *Addiction Research & Theory*, 30(4), 268-278. <https://doi.org/https://doi.org/10.1080/16066359.2021.2021400>
- Park, Y. S., McMorris, B. J., Pruinelli, L., Song, Y., Kaas, M. J., & Wyman, J. F. (2021). Use of geographic information systems to explore associations between neighborhood attributes and mental health outcomes in adults: a systematic review. *International Journal of Environmental Research and Public Health*, 18(16), 8597. <https://doi.org/10.3390/ijerph18168597>
- Parker, M., Bucknall, M., Jagger, C., & Wilkie, R. (2020). Population-based estimates of healthy working life expectancy in England at age 50 years: analysis of data from the English Longitudinal Study of Ageing. *The Lancet Public Health*, 5(7), e395-e403. [https://doi.org/10.1016/S2468-2667\(20\)30114-6](https://doi.org/10.1016/S2468-2667(20)30114-6)
- Patrick, M. E., Terry-McElrath, Y. M., Miech, R. A., Keyes, K. M., Jager, J., & Schulenberg, J. E. (2022). Alcohol use and the COVID-19 pandemic: Historical trends in drinking, contexts, and reasons for use among U.S. adults. *Social Science & Medicine*, 301, 1–9. <https://doi.org/10.1016/j.socscimed.2022.114887>
- Pavlova, M. K., Silbereisen, R. K., & Sijko, K. (2014). Social participation in Poland: Links to emotional well-being and risky alcohol consumption. *Social Indicators Research*, 117(1), 29-44. <https://doi.org/https://doi.org/10.1007/s11205-013-0332-9>
- Paxton, P. (1999). Is social capital declining in the United States? A multiple indicator assessment. *American Journal of Sociology*, 105(1), 88-127. <https://doi.org/10.1086/210268>
- Peacock, A., Leung, J., Larney, S., Colledge, S., Hickman, M., Rehm, J., ... & Degenhardt, L. (2018). Global statistics on alcohol, tobacco and illicit drug use: 2017 status report. *Addiction*, 113(10), 1905-1926. <https://doi.org/10.1111/add.14234>
- Pearlin, L. I. (1989). The sociological study of stress. *Journal of Health and Social Behavior*, 241-256. <https://doi.org/10.2307/2136956>
- Pearlin, L. I., Menaghan, E. G., Lieberman, M. A., & Mullan, J. T. (1981). The stress process. *Journal of Health and Social Behavior*, 337-356. <https://doi.org/10.2307/2136676>
- Pearson, M. M., Kim, N. J., Berry, K., Moon, A. M., Su, F., Vutien, P., ... & Ioannou, G. N. (2021). Associations between alcohol use and Liver-Related outcomes in a large national cohort of patients with cirrhosis. *Hepatology Communications*, 5(12), 2080-2095. <https://doi.org/10.1002/hep4.1776>

- Pei, F., Wang, Y., Wu, Q., McCarthy, K. S., & Wu, S. (2020). The roles of neighborhood social cohesion, peer substance use, and adolescent depression in adolescent substance use. *Children and Youth Services Review*, 112, 104931. <https://doi.org/10.1016/j.childyouth.2020.104931>
- Pénard, T., & Poussing, N. (2010). Internet use and social capital: The strength of virtual ties. *Journal of Economic Issues*, 44(3), 569-595. <https://doi.org/10.2753/JEI0021-3624440301>
- Pennay, A., & Room, R. (2016). Drinking cultures and change: Local, national and global. *Drugs: Education, Prevention and Policy*, 23(4), 267-269. <https://doi.org/10.1080/09687637.2016.1189877>
- Perez, L. G., Tucker, J. S., Pedersen, E. R., Troxel, W. M., Rodriguez, A., Firth, C. L., ... & D'Amico, E. J. (2022). Neighborhood social environment change in late adolescence predicts substance use in emerging adulthood. *Health & Place*, 75, 102807. <https://doi.org/10.1016/j.healthplace.2022.102807>
- PhotoVoice. (2023). *Statement of ethical practice*. <https://photovoice.org/wp-content/uploads/2023/07/PV232-01-Statement-of-Ethical-Practice.pdf>
- Pickett, K. E., & Pearl, M. (2001). Multilevel analyses of neighbourhood socioeconomic context and health outcomes: a critical review. *Journal of Epidemiology & Community Health*, 55(2), 111-122. <https://doi.org/10.1136/jech.55.2.111>
- Plano Clark, V. L., & Ivankova, N. V. (2015). *Mixed methods research: A guide to the field* (Vol. 3). Sage publications.
- Pollack, C. E., Cubbin, C., Ahn, D., & Winkleby, M. (2005). Neighbourhood deprivation and alcohol consumption: does the availability of alcohol play a role?. *International Journal of Epidemiology*, 34(4), 772-780. <https://doi.org/10.1093/ije/dyi026>
- Poortinga, W. (2006). Do health behaviors mediate the association between social capital and health?. *Preventive Medicine*, 43(6), 488-493. <https://doi.org/10.1016/j.ypmed.2006.06.004>
- Poortinga, W. (2012). Community resilience and health: The role of bonding, bridging, and linking aspects of social capital. *Health & Place*, 18(2), 286-295. <https://doi.org/10.1016/j.healthplace.2011.09.017>
- Portes, A. (1998). Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, 24, 1-24.
- Portes, A., & Landolt, P. (2000). Social capital: promise and pitfalls of its role in development. *Journal of Latin American Studies*, 32(2), 529-547. <https://doi.org/10.1017/S0022216X00005836>
- Portes, A., & Vickstrom, E. (2011). Diversity, social capital, and cohesion. *Annual Review of Sociology*, 37, 461-479. <https://doi.org/10.1146/annurev-soc-081309-150022>
- Porthé, V., García-Subirats, I., Clotas, C., & Diez, E. (2022). Evaluation of a Community Intervention to Reduce Harmful Alcohol Consumption among Adult Population: A Study Protocol [Article]. *International journal of environmental research and public health*, 19(14), 13, Article 8746. <https://doi.org/10.3390/ijerph19148746>
- Priester, M. A., Browne, T., Iachini, A., Clone, S., DeHart, D., & Seay, K. D. (2016). Treatment access barriers and disparities among individuals with co-occurring mental health and substance use disorders: an integrative literature review. *Journal of Substance Abuse Treatment*, 61, 47-59. <https://doi.org/10.1016/j.jsat.2015.09.006>
- Probst, C., Manthey, J., Martinez, A., & Rehm, J. (2015). Alcohol use disorder severity and reported reasons not to seek treatment: a cross-sectional study in European primary care practices. *Substance Abuse Treatment, Prevention, and Policy*, 10, 1-10. <https://doi.org/10.1186/s13011-015-0028-z>
- Public Health England. (2016). The public health burden of alcohol and the effectiveness and cost-effectiveness of alcohol control policies: an evidence review. Available at: <https://www.gov.uk/government/publications/the-public-health-burden-of-alcohol-evidence-review> (Accessed 12 June 2024)
- Public Health England. (2017). *Better care for people with co-occurring mental health and alcohol/drug use conditions: a guide for commissioners and service providers*.

- Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/625809/Co-occurring mental health and alcohol drug use conditions.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/625809/Co-occurring_mental_health_and_alcohol_drug_use_conditions.pdf) (Accessed 12 June 2024)
- Public Health England. (2018, October 4). *Young people commissioning support: Principles and indicators*. Available at: <https://www.gov.uk/government/publications/alcohol-drugs-and-tobacco-commissioning-support-pack/young-people-substance-misuse-commissioning-support-2019-to-2020-principles-and-indicators> (Accessed 12 June 2024)
- Public Health England. (2020). Adult substance misuse treatment statistics 2019 to 2020: report. Available at: <https://www.gov.uk/government/statistics/substance-misuse-treatment-for-adults-statistics-2019-to-2020/adult-substance-misuse-treatment-statistics-2019-to-2020-report> (Accessed 18 July 2024)
- Puddephatt, J. A., Irizar, P., Jones, A., Gage, S. H., & Goodwin, L. (2022). Associations of common mental disorder with alcohol use in the adult general population: a systematic review and meta-analysis. *Addiction*, 117(6), 1543-1572. <https://doi.org/10.1111/add.15735>
- Puddephatt, J. A., Jones, A., Gage, S. H., Fear, N. T., Field, M., McManus, S., ... & Goodwin, L. (2021). Associations of alcohol use, mental health and socioeconomic status in England: findings from a representative population survey. *Drug and Alcohol Dependence*, 219, 108463. <https://doi.org/10.1016/j.drugalcdep.2020.108463>
- Puddephatt, J. A., Makin, H., Gage, S. H., Jones, A., & Goodwin, L. (2023). Understanding alcohol use and changes in drinking habits among people with a severe mental illness: a qualitative framework analysis study. *Frontiers in Psychology*, 14, 1282086. <https://doi.org/10.3389/fpsyg.2023.1282086>
- Putnam, R. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, 6(1), 65-78.
- Putnam, R. D. (2007). E pluribus unum: Diversity and community in the twenty-first century the 2006 Johan Skytte Prize Lecture. *Scandinavian Political Studies*, 30(2), 137-174. <https://doi.org/10.1111/j.1467-9477.2007.00176.x>
- Rachele, J. N., Wood, L., Nathan, A., Giskes, K., & Turrell, G. (2016). Neighbourhood disadvantage and smoking: Examining the role of neighbourhood-level psychosocial characteristics. *Health & Place*, 40, 98-105. <https://doi.org/10.1016/j.healthplace.2016.04.012>
- Racine, E., Sattler, S., & Escande, A. (2017). Free will and the brain disease model of addiction: The not so seductive allure of neuroscience and its modest impact on the attribution of free will to people with an addiction. *Frontiers in Psychology*, 8, 1850. <https://doi.org/10.3389/fpsyg.2017.01850>
- Raimo, E. B., & Schuckit, M. A. (1998). Alcohol dependence and mood disorders. *Addictive Behaviors*, 23(6), 933-946. [https://doi.org/10.1016/S0306-4603\(98\)00068-9](https://doi.org/10.1016/S0306-4603(98)00068-9)
- Raninen, J., & Livingston, M. (2020). The theory of collectivity of drinking cultures: how alcohol became everyone's problem. *Addiction*, 115(9). <https://doi.org/10.1111/add.15057>
- Reboussin, B. A., Johnson, R. M., Green, K. M., Furr-Holden, C. D. M., Ialongo, N. S., & Milam, A. J. (2019). Neighborhood context and transitions in marijuana use among urban young adults [Article]. *Substance Use & Misuse*, 54(7), 1075-1085. <https://doi.org/10.1080/10826084.2018.1528461>
- Reiger, D. A., Farmer, M. E., Rae, D. S., Locke, B. Z., Keith, S. J., Judd, L. L., & Goodwin, F. K. (1990). Comorbidity of mental disorders with alcohol and other drug abuse: results from the Epidemiologic Catchment Area (ECA) study. *Jama*, 264(19), 2511-2518. <http://dx.doi.org/10.1001/jama.1990.03450190043026>
- Rehm, J. (2011). The risks associated with alcohol use and alcoholism. *Alcohol Research & Health*, 34(2), 135-143.
- Rehm, J., & Shield, K. D. (2019). Global burden of alcohol use disorders and alcohol liver disease. *Biomedicines*, 7(4), 99. <https://doi.org/10.3390/biomedicines7040099>

- Reinert, D. F., & Allen, J. P. (2007). The alcohol use disorders identification test: an update of research findings. *Alcoholism: Clinical and Experimental Research*, 31(2), 185-199. <https://doi.org/10.1111/j.1530-0277.2006.00295.x>
- Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: a systematic review. *Social Science & Medicine*, 90, 24-31. <https://doi.org/10.1016/j.socscimed.2013.04.026>
- Reitzel, L. R., Kendzor, D. E., Castro, Y., Cao, Y., Businelle, M. S., Mazas, C. A., ... & Wetter, D. W. (2013). The relation between social cohesion and smoking cessation among black smokers, and the potential role of psychosocial mediators. *Annals of Behavioral Medicine*, 45(2), 249-257. <https://doi.org/10.1007/s12160-012-9438-6>
- Reynolds, K. J., Subašić, E., & Tindall, K. (2015). The problem of behaviour change: From social norms to an ingroup focus. *Social and Personality Psychology Compass*, 9(1), 45-56. <https://doi.org/10.1111/spc3.12155>
- Rhew, I. C., Kosterman, R., & Lee, J. O. (2017). Neighborhood typologies associated with alcohol use among adults in their 30s: A finite mixture modeling approach. *Journal of Urban Health*, 94, 542-548. <https://doi.org/10.1007/s11524-017-0161-2>
- Rhynas, S., Schölin, L., Cuthill, F., Walker, B., & Holloway, A. (2020). Exploring social support and identity in recovery: a photovoice study. Available at: <https://alcoholchange.org.uk/publication/exploring-social-support-and-identity-in-recovery-a-photovoice-study> (Accessed 18 July 2024)
- Richard, L., Gauvin, L., & Raine, K. (2011). Ecological models revisited: their uses and evolution in health promotion over two decades. *Annual Review of Public Health*, 32, 307-326. <https://doi.org/10.1146/annurev-publhealth-031210-101141>
- Rigolon, A., Browning, M. H., McAnirlin, O., & Yoon, H. (2021). Green space and health equity: a systematic review on the potential of green space to reduce health disparities. *International Journal of Environmental Research and Public Health*, 18(5), 2563. <https://doi.org/10.3390/ijerph18052563>
- Riley, D., & Eckenrode, J. (1986). Social ties: Subgroup differences in costs and benefits. *Journal of Personality and Social Psychology*, 51(4), 770. <https://doi.org/10.1037/0022-3514.51.4.770>
- Risso, C., Boniface, S., Subbaraman, M. S., & Englund, A. (2020). Does cannabis complement or substitute alcohol consumption? A systematic review of human and animal studies. *Journal of Psychopharmacology*, 34(9), 938–954. <https://doi.org/10.1177/0269881120919970>
- Riva, M., Gauvin, L., & Barnett, T. A. (2007). Toward the next generation of research into small area effects on health: a synthesis of multilevel investigations published since July 1998. *Journal of Epidemiology & Community Health*, 61(10), 853-861. <https://doi.org/10.1136/jech.2006.050740>
- Roberts, A., Rogers, J., Mason, R., Siriwardena, A. N., Hogue, T., Whitley, G. A., & Law, G. R. (2021). Alcohol and other substance use during the COVID-19 pandemic: A systematic review. *Drug and Alcohol Dependence*, 229, 109150. <https://doi.org/10.1016/j.drugalcdep.2021.109150>
- Robertson, L., Hoek, J., & Blank, M.-L. (2022). A qualitative analysis of electronic nicotine delivery systems (ENDS) uptake and use among young adult never-smokers in New Zealand. *PLoS ONE*, 17(5), 13. <https://doi.org/https://doi.org/10.1371/journal.pone.0268449>
- Robinson, M., Shipton, D., Walsh, D., Whyte, B., & McCartney, G. (2015). Regional alcohol consumption and alcohol-related mortality in Great Britain: novel insights using retail sales data. *BMC Public Health*, 15, 1-9. <https://doi.org/10.1186/1471-2458-15-1>
- Robinson, T. E., & Berridge, K. C. (1993). The neural basis of drug craving: an incentive-sensitization theory of addiction. *Brain Research Reviews*, 18(3), 247-291. [https://doi.org/10.1016/0165-0173\(93\)90013-P](https://doi.org/10.1016/0165-0173(93)90013-P)
- Roda, C., Charreire, H., Feuillet, T., Mackenbach, J. D., Compernelle, S., Glonti, K., ... & Oppert, J. M. (2016). Mismatch between perceived and objectively measured

- environmental obesogenic features in European neighbourhoods. *Obesity Reviews*, 17, 31-41. <https://doi.org/10.1111/obr.12376>
- Roerecke, M., & Rehm, J. (2013). Alcohol use disorders and mortality: a systematic review and meta-analysis. *Addiction*, 108(9), 1562-1578. <https://doi.org/10.1111/add.12231>
- Rogers, E. M. (1995). Diffusion of innovations. New York, NY: The Free Press.
- Ronzi, S., Pope, D., Orton, L., & Bruce, N. (2016). Using photovoice methods to explore older people's perceptions of respect and social inclusion in cities: Opportunities, challenges and solutions. *SSM-Population Health*, 2, 732-745. <https://doi.org/10.1016/j.ssmph.2016.09.004>.
- Room, R., Ferris, J., Laslett, A. M., Livingston, M., Mugavin, J., & Wilkinson, C. (2010). The drinker's effect on the social environment: a conceptual framework for studying alcohol's harm to others. *International Journal of Environmental Research and Public Health*, 7(4), 1855-1871. <https://doi.org/10.3390/ijerph7041855>
- Rosenberg, G., Bauld, L., Hooper, L., Buykx, P., Holmes, J., & Vohra, J. (2018). New national alcohol guidelines in the UK: public awareness, understanding and behavioural intentions. *Journal of Public Health*, 40(3), 549-556. <https://doi.org/10.1093/pubmed/idx126>
- Ross, C. E., & Jang, S. J. (2000). Neighborhood disorder, fear, and mistrust: The buffering role of social ties with neighbors. *American Journal of Community Psychology*, 28, 401-420. <https://doi.org/10.1023/A:1005137713332>
- Ross, C. E., & Mirowsky, J. (2001). Neighborhood disadvantage, disorder, and health. *Journal of Health and Social Behavior*, 258-276. <https://doi.org/10.2307/3090214>
- Rowland, B. C., Wolfenden, L., Gillham, K., Kingsland, M., Richardson, B., & Wiggers, J. (2015). Is alcohol and community sport a good mix? Alcohol management, consumption and social capital in community sports clubs. *Australian and New Zealand journal of public health*, 39(3), 210-215. <https://doi.org/10.1111/1753-6405.12280>
- Rudkin, J. K., & Davis, A. (2007). Photography as a tool for understanding youth connections to their neighborhood. *Children, Youth and Environments*, 17(4), 107-123. <https://doi.org/10.1353/cye.2007.0000>
- Ruiz, M., Malyutina, S., Pajak, A., Kozela, M., Kubinova, R., & Bobak, M. (2019). Congruent relations between perceived neighbourhood social cohesion and depressive symptoms among older European adults: An East-West analysis. *Social Science & Medicine*, 237, 112454. <https://doi.org/10.1016/j.socscimed.2019.112454>
- Rutherford, H. J. V., & Mayes, L. C. (2019). Parenting stress: A novel mechanism of addiction vulnerability. *Neurobiology of Stress*, 11, Article 100172. <https://doi.org/10.1016/j.ynstr.2019.100172>
- Sacco, P., Bucholz, K. K., & Spitznagel, E. L. (2009). Alcohol use among older adults in the National Epidemiologic Survey on Alcohol and Related Conditions: A latent class analysis. *Journal of Studies on Alcohol and Drugs*, 70(6), 829-838. <https://doi.org/10.15288/jsad.2009.70.829>
- Saeri, A. K., Cruwys, T., Barlow, F. K., Stronge, S., & Sibley, C. G. (2018). Social connectedness improves public mental health: Investigating bidirectional relationships in the New Zealand attitudes and values survey. *Australian & New Zealand Journal of Psychiatry*, 52(4), 365-374. <https://doi.org/10.1177/0004867417723990>
- Salehi, A., Ehrlich, C., Kendall, E., & Sav, A. (2019). Bonding and bridging social capital in the recovery of severe mental illness: a synthesis of qualitative research. *Journal of Mental Health*, 28(3), 331-339. <https://doi.org/10.1080/09638237.2018.1466033>
- Salvatore, M. A., & Grundy, E. (2021). Area deprivation, perceived neighbourhood cohesion and mental health at older ages: A cross lagged analysis of UK longitudinal data. *Health & Place*, 67, 102470. <https://doi.org/10.1016/j.healthplace.2020.102470>
- Sampson, R. J., & Groves, W. B. (1989). Community structure and crime: Testing social-disorganization theory. *American Journal of Sociology*, 94(4), 774-802. <https://doi.org/10.1086/229068>

- Sampson, R. J., & Raudenbush, S. W. (1999). Systematic social observation of public spaces: A new look at disorder in urban neighborhoods. *American Journal of Sociology*, 105(3), 603-651. <https://doi.org/10.1086/210356>
- Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science*, 277(5328), 918-924. <https://doi.org/10.1126/science.277.5328.918>
- Samuel, L. J., Commodore-Mensah, Y., & Himmelfarb, C. R. D. (2013). Developing behavioral theory with the systematic integration of community social capital concepts. *Health Education & Behavior*, 41(4), 359-375. <https://doi.org/10.1177/1090198113504412>
- Sánchez-Ledesma, E., Vázquez-Vera, H., Sagarra, N., Peralta, A., Porthé, V., & Díez, È. (2020). Perceived pathways between tourism gentrification and health: A participatory Photovoice study in the Gòtic neighborhood in Barcelona. *Social Science & Medicine*, 258, 113095. <https://doi.org/10.1016/j.socscimed.2020.113095>
- Sansone, G., Fong, G. T., Hall, P. A., Guignard, R., Beck, F., Mons, U., ... & Jiang, Y. (2013). Time perspective as a predictor of smoking status: Findings from the International Tobacco Control (ITC) Surveys in Scotland, France, Germany, China, and Malaysia. *BMC Public Health*, 13, 1-8. <https://doi.org/10.1186/1471-2458-13-346>
- Saraceno, L., Munafó, M., Heron, J., Craddock, N., & Van Den Bree, M. B. (2009). Genetic and non-genetic influences on the development of co-occurring alcohol problem use and internalizing symptomatology in adolescence: A review. *Addiction*, 104(7), 1100-1121. <https://doi.org/10.1111/j.1360-0443.2009.02571.x>
- Sarich, P., Gao, S., Zhu, Y., Canfell, K., & Weber, M. F. (2024). The association between alcohol consumption and all-cause mortality: An umbrella review of systematic reviews using lifetime abstainers or low-volume drinkers as a reference group. *Addiction*, 119(6), 998-1012. <https://doi.org/10.1111/add.16446>
- Sarracino, F., & Mikucka, M. (2017). Social capital in Europe from 1990 to 2012: Trends and convergence. *Social Indicators Research*, 131(1), 407-432. <https://doi.org/10.1007/s11205-016-1255-z>
- Saunders, J. B., Aasland, O. G., Babor, T. F., De la Fuente, J. R., & Grant, M. (1993). Development of the alcohol use disorders identification test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption-II. *Addiction*, 88(6), 791-804. <https://doi.org/10.1111/j.1360-0443.1993.tb02093.x>
- Saunders, J. B., Degenhardt, L., Reed, G. M., & Poznyak, V. (2019). Alcohol use disorders in ICD-11: Past, present, and future. *Alcoholism: Clinical and Experimental Research*, 43(8), 1617-1631. <https://doi.org/10.1111/acer.14128>
- Saville, C. W. (2021). Ecological social capital does not predict geographical variance in increases in depression following the 2008 financial crisis. *British Journal of Psychology*, 112(1), 163-179. <https://doi.org/10.1111/bjop.12448>
- Sawyer, A., Ucci, M., Jones, R., Smith, L., & Fisher, A. (2018). Supportive environments for physical activity in deprived communities in the United Kingdom: A qualitative study using photo elicitation. *Social Science & Medicine*, 197, 49-58. <https://doi.org/10.1016/j.socscimed.2017.11.048>
- Schiefer, D., & Van der Noll, J. (2017). The essentials of social cohesion: A literature review. *Social Indicators Research*, 132, 579-603. <https://doi.org/10.1007/s11205-016-1314-5>
- Schoonenboom, J., & Johnson, R. B. (2017). How to construct a mixed methods research design. *Kolner Zeitschrift für Soziologie und Sozialpsychologie*, 69(Suppl 2), 107. <https://doi.org/10.1007/s11577-017-0454-1>
- Schuler, M. S., Puttaiah, S., Mojtabai, R., & Crum, R. M. (2015). Perceived barriers to treatment for alcohol problems: a latent class analysis. *Psychiatric Services*, 66(11), 1221-1228. <https://doi.org/10.1176/appi.ps.201400160>
- Scott, S., Elamin, W., Giles, E. L., Hillier-Brown, F., Byrnes, K., Connor, N., ... & Ells, L. (2019). Socio-ecological influences on adolescent (aged 10–17) alcohol use and unhealthy eating behaviours: A systematic review and synthesis of qualitative studies. *Nutrients*, 11(8), 1914. <https://doi.org/10.3390/nu11081914>

- Scribner, R. A., Cohen, D. A., & Fisher, W. (2000). Evidence of a structural effect for alcohol outlet density: a multilevel analysis. *Alcoholism: Clinical and Experimental Research*, 24(2), 188-195. <https://doi.org/10.1111/j.1530-0277.2000.tb04590.x>
- Scribner, R., Theall, K. P., Ghosh-Dastidar, B., Mason, K., Cohen, D., & Simonsen, N. (2007). Determinants of social capital indicators at the neighborhood level: a longitudinal analysis of loss of off-sale alcohol outlets and voting. *Journal of Studies on Alcohol and Drugs*, 68(6), 934-943. <https://doi.org/10.15288/jsad.2007.68.934>
- Secretti, T., Nunes, M. A. A., Schmidt, M. I., Stein, M. C., & Santos, S. M. (2019). Characteristics of neighborhood environment (social cohesion and safety) and common mental disorders in ELSA-Brasil study: a multilevel analysis. *Cadernos de Saúde Pública*, 35, e00197017. <https://doi.org/10.1590/0102-311X00197017>
- Seid, A. K. (2016). Social interactions, trust and risky alcohol consumption [Article]. *Health Economics Review*, 6, 9, Article 3. <https://doi.org/10.1186/s13561-016-0081-y>
- Seid, A. K., Hesse, M., & Bloomfield, K. (2016). 'Make it another for me and my mates': does social capital encourage risky drinking among the Danish general population?. *Scandinavian Journal of Public Health*, 44(3), 240-248. <https://doi.org/10.1177/1403494815619536>
- Seitz, C. M., & Strack, R. W. (2016). Conducting public health photovoice projects with those who are homeless: A review of the literature. *Journal of Social Distress and the Homeless*, 25(1), 33-40. <https://doi.org/10.1080/10530789.2015.1135565>
- Selzer, M. L. (1971). The Michigan Alcoholism Screening Test: The quest for a new diagnostic instrument. *American Journal of Psychiatry*, 127(12), 1653-1658. <https://doi.org/10.1176/ajp.127.12.1653>
- Shadmi, E., Chen, Y., Dourado, I., Faran-Perach, I., Furler, J., Hangoma, P., ... & Willems, S. (2020). Health equity and COVID-19: global perspectives. *International Journal for Equity in Health*, 19, 1-16. <https://doi.org/10.1186/s12939-020-01218-z>
- Shaper, A. G., Wannamethee, G., & Walker, M. (1988). Alcohol and mortality in British men: explaining the U-shaped curve. *The Lancet*, 332(8623), 1267-1273. [https://doi.org/10.1016/S0140-6736\(88\)92890-5](https://doi.org/10.1016/S0140-6736(88)92890-5)
- Shaw, C. R., & McKay, H. D. (1942). *Juvenile delinquency and urban areas*. Chicago: University of Chicago Press.
- Shaw, R. J., Atkin, K., Bécares, L., Albor, C. B., Stafford, M., Kiernan, K. E., ... & Pickett, K. E. (2012). Impact of ethnic density on adult mental disorders: narrative review. *The British Journal of Psychiatry*, 201(1), 11-19. <https://doi.org/10.1192/bjp.bp.110.083675>
- Shepherd, V. (2020). An under-represented and underserved population in trials: methodological, structural, and systemic barriers to the inclusion of adults lacking capacity to consent. *Trials*, 21, 1-8. <https://doi.org/10.1186/s13063-020-04406-y>
- Shield, K. D., Parry, C., & Rehm, J. (2014). Chronic diseases and conditions related to alcohol use. *Alcohol Research: Current Reviews*, 35(2), 155-173.
- Shortt, N. K., Rhynas, S. J., & Holloway, A. (2017). Place and recovery from alcohol dependence: A journey through photovoice. *Health & Place*, 47, 147-155. <https://doi.org/10.1016/j.healthplace.2017.08.008>
- Silva, M. (2023, October 3). *15 minute cities: How they got caught in conspiracy theories*. BBC News. Available at: <https://www.bbc.co.uk/news/uk-politics-66990302> (Accessed 12 June 2024)
- Silva, M., Loureiro, A., & Cardoso, G. (2016). Social determinants of mental health: a review of the evidence. *The European Journal of Psychiatry*, 30(4), 259-292.
- Simpson, C. A., & Tucker, J. A. (2002). Temporal sequencing of alcohol-related problems, problem recognition, and help-seeking episodes. *Addictive Behaviors*, 27(5), 659-674. [https://doi.org/10.1016/S0306-4603\(01\)00200-3](https://doi.org/10.1016/S0306-4603(01)00200-3)
- Sinha, R., Fox, H. C., Hong, K. A., Bergquist, K., Bhagwagar, Z., & Siedlarz, K. M. (2009). Enhanced negative emotion and alcohol craving, and altered physiological responses following stress and cue exposure in alcohol dependent individuals. *Neuropsychopharmacology*, 34(5), 1198-1208. <https://doi.org/10.1038/npp.2008.78>

- Skog, O. J. (2001). Commentary on Gmel & Rehm's interpretation of the theory of collectivity of drinking culture. *Drug and Alcohol Review*, 20(3), 325-331. <https://doi.org/10.1080/09595230120079648>
- Skog, O.-J. (1985). The collectivity of drinking cultures: A theory of the distribution of alcohol consumption. *British Journal of Addiction*, 80(1), 83–99. <https://doi.org/10.1111/j.1360-0443.1985.tb05294.x>
- Skogen, J. C., Bøe, T., Thørrisen, M. M., Riper, H., & Aas, R. W. (2019). Sociodemographic characteristics associated with alcohol consumption and alcohol-related consequences, a latent class analysis of The Norwegian WIRUS screening study. *BMC Public Health*, 19, 1-12. <https://doi.org/10.1186/s12889-019-7648-6>
- Skrzynski, C. J., & Creswell, K. G. (2020). Associations between solitary drinking and increased alcohol consumption, alcohol problems, and drinking to cope motives in adolescents and young adults: a systematic review and meta-analysis. *Addiction*, 115(11), 1989-2007. <https://doi.org/10.1111/add.15055>
- Skrzynski, C. J., & Creswell, K. G. (2021). A systematic review and meta-analysis on the association between solitary drinking and alcohol problems in adults. *Addiction*, 116(9), 2289-2303. <https://doi.org/10.1111/add.15355>
- Sliedrecht, W., de Waart, R., Witkiewitz, K., & Roozen, H. G. (2019). Alcohol use disorder relapse factors: A systematic review. *Psychiatry Research*, 278, 97-115. <https://doi.org/10.1016/j.psychres.2019.05.038>
- Slutske, W. S., Deutsch, A. R., & Piasecki, T. M. (2016). Neighborhood contextual factors, alcohol use, and alcohol problems in the United States: evidence from a nationally representative study of young adults. *Alcoholism: Clinical and Experimental Research*, 40(5), 1010-1019.
- Smart, A., & Harrison, E. (2017). The under-representation of minority ethnic groups in UK medical research. *Ethnicity & Health*, 22(1), 65-82. <https://doi.org/10.1080/13557858.2016.1182126>
- Smith, E., Carter, M., Walklet, E., & Hazell, P. (2023). Investigating recovery from problem substance use using digital photovoice [Article]. *Journal of Community Psychology*, 51(3), 1378-1393. <https://doi.org/10.1002/jcop.22957>
- Smith, G. W., & Shevlin, M. (2008). Patterns of alcohol consumption and related behaviour in Great Britain: a latent class analysis of the alcohol use disorder identification test (AUDIT). *Alcohol & Alcoholism*, 43(5), 590-594. <https://doi.org/10.1093/alcalc/agn041>
- Smith, J. J., Spanakis, P., Gribble, R., Stevelink, S. A., Rona, R. J., Fear, N. T., & Goodwin, L. (2022). Prevalence of at-risk drinking recognition: A systematic review and meta-analysis. *Drug and Alcohol Dependence*, 235, 109449. <https://doi.org/10.1016/j.drugalcdep.2022.109449>
- Smith, M. P., Olatunde, O., & White, C. (2010). Inequalities in disability-free life expectancy by area deprivation: England, 2001–04 and 2005–08. *Health Statistics Quarterly*, 48, 36-57. <https://doi.org/10.1057/hsq.2010.20>
- Sokol, R. J., Martier, S. S., & Ager, J. W. (1989). The T-ACE questions: practical prenatal detection of risk-drinking. *American Journal of Obstetrics and Gynecology*, 160(4), 863-870. [https://doi.org/10.1016/0002-9378\(89\)90302-5](https://doi.org/10.1016/0002-9378(89)90302-5)
- Solmi, F., Colman, I., Weeks, M., Lewis, G., & Kirkbride, J. B. (2017). Trajectories of neighborhood cohesion in childhood, and psychotic and depressive symptoms at age 13 and 18 years. *Journal of the American Academy of Child & Adolescent Psychiatry*, 56(7), 570-577. <https://doi.org/10.1016/j.jaac.2017.04.003>
- Stafford, M., Gimeno, D., & Marmot, M. G. (2008). Neighbourhood characteristics and trajectories of health functioning: a multilevel prospective analysis. *The European Journal of Public Health*, 18(6), 604-610. <https://doi.org/10.1093/eurpub/ckn091>
- StataCorp. (2021). *Stata Statistical Software: Release 17*. College Station, TX: StataCorp LLC.
- Staudt, A., Freyer-Adam, J., Meyer, C., John, U., & Baumann, S. (2018). Short-term stability of different drinking patterns over the course of four weeks among adults. A latent

- transition analysis. *Drug and Alcohol Dependence*, 191, 181-186. <https://doi.org/10.1016/j.drugalcdep.2018.06.031>
- Steel, Z., Marnane, C., Iranpour, C., Chey, T., Jackson, J. W., Patel, V., & Silove, D. (2014). The global prevalence of common mental disorders: a systematic review and meta-analysis 1980–2013. *International Journal of Epidemiology*, 43(2), 476-493. <https://doi.org/10.1093/ije/dyu038>
- Stephens, M. A. C., & Wand, G. (2012). Stress and the HPA axis: role of glucocorticoids in alcohol dependence. *Alcohol Research: Current Reviews*, 34(4), 468.
- Steptoe, A., & Feldman, P. J. (2001). Neighborhood problems as sources of chronic stress: development of a measure of neighborhood problems, and associations with socioeconomic status and health. *Annals of Behavioral Medicine*, 23(3), 177-185. https://doi.org/10.1207/S15324796ABM2303_5
- Stewart, J., Bleumers, L., & Van Looy, J. (2013). The potential of digital games for empowerment and social inclusion of groups at risk of social and economic exclusion: evidence and opportunity for policy. JRC Scientific and Policy Report, vol. 25900 EN, Joint Research Centre of the European Commission (JRC). <https://doi.org/10.2791/88148>
- Stineman, M. G., & Streim, J. E. (2010). The biopsychosocial paradigm: a foundational theory for medicine. *PM&R*, 2(11), 1035-1045. <https://doi.org/10.1016/j.pmri.2010.06.013>
- Stockdale, S. E., Wells, K. B., Tang, L., Belin, T. R., Zhang, L., & Sherbourne, C. D. (2007). The importance of social context: Neighborhood stressors, stress-buffering mechanisms, and alcohol, drug, and mental health disorders. *Social Science & Medicine*, 65(9), 1867-1881. <https://doi.org/10.1016/j.socscimed.2007.05.045>
- Stok, F. M., Bal, M., Yerkes, M. A., & De Wit, J. B. (2021). Social inequality and solidarity in times of COVID-19. *International Journal of Environmental Research and Public Health*, 18(12), 6339. <https://doi.org/10.3390/ijerph18126339>
- Stone, R. (2015). Pregnant women and substance use: fear, stigma, and barriers to care. *Health & Justice*, 3, 1-15. <https://doi.org/10.1186/s40352-015-0015-5>
- Stuart, S. R., Tansey, L., & Quayle, E. (2017). What we talk about when we talk about recovery: a systematic review and best-fit framework synthesis of qualitative literature. *Journal of Mental Health*, 26(3), 291-304. <https://doi.org/10.1080/09638237.2016.1222056>
- Studer, J., Baggio, S., Grazioli, V. S., Mohler-Kuo, M., Daeppen, J.-B., & Gmel, G. (2016). Risky substance use and peer pressure in Swiss young men: Test of moderation effects. *Drug and Alcohol Dependence*, 168, 89-98. <https://doi.org/10.1016/j.drugalcdep.2016.08.633>
- Suarez, G. L., Burt, S. A., Gard, A. M., Burton, J., Clark, D. A., Klump, K. L., & Hyde, L. W. (2022). The impact of neighborhood disadvantage on amygdala reactivity: Pathways through neighborhood social processes. *Developmental Cognitive Neuroscience*, 54, 101061. <https://doi.org/10.1016/j.dcn.2022.101061>
- Subhani, M., Talat, U., Knight, H., Morling, J. R., Jones, K. A., Aithal, G. P., ... & Rennick-Egglestone, S. (2022). Characteristics of alcohol recovery narratives: Systematic review and narrative synthesis. *Plos one*, 17(5), e0268034. <https://doi.org/10.1371/journal.pone.0268034>
- Sui, Y., Ettema, D., & Helbich, M. (2022). Longitudinal associations between the neighborhood social, natural, and built environment and mental health: A systematic review with meta-analyses. *Health & Place*, 77, 102893. <https://doi.org/10.1016/j.healthplace.2022.102893>
- Sundquist, J., Hamano, T., Li, X., Kawakami, N., Shiwa, K., & Sundquist, K. (2014). Neighborhood linking social capital as a predictor of psychiatric medication prescription in the elderly: a Swedish national cohort study. *Journal of Psychiatric Research*, 55, 44-51. <https://doi.org/10.1016/j.jpsychires.2014.04.013>
- Swendsen, J., Conway, K. P., Degenhardt, L., Glantz, M., Jin, R., Merikangas, K. R., ... & Kessler, R. C. (2010). Mental disorders as risk factors for substance use, abuse and

- dependence: results from the 10-year follow-up of the National Comorbidity Survey. *Addiction*, 105(6), 1117-1128. <https://doi.org/10.1111/j.1360-0443.2010.02902.x>
- Swift, R. M., & Aston, E. R. (2015). Pharmacotherapy for alcohol use disorder: current and emerging therapies. *Harvard Review of Psychiatry*, 23(2), 122-133. <https://doi.org/10.1097/HRP.0000000000000079>
- Szabó, Á., Towers, A., Sheridan, J., & Newcombe, D. (2021). Ten-year trajectories of alcohol consumption in older adult New Zealanders. *The Journals of Gerontology: Series B*, 76(3), 496-506. <https://doi.org/10.1093/geronb/gbz143>
- Szreter, S., & Woolcock, M. (2004). Health by association? Social capital, social theory, and the political economy of public health. *International Journal of Epidemiology*, 33(4), 650-667. <https://doi.org/10.1093/ije/dyh013>
- Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The Social Psychology of Intergroup Relations* (pp. 33-47). Brooks/Cole.
- Takakura, M., Miyagi, M., Ueji, M., Kobayashi, M., Kurihara, A., & Kyan, A. (2019). The relative association of collective efficacy in school and neighborhood contexts with adolescent alcohol use. *Journal of Epidemiology*, 29(10), 384-390. <https://doi.org/10.2188/jea.JE20180125>
- Tam, C. C., Karriker-Jaffe, K. J., & Greenfield, T. K. (2021). Drinking and Neighborhood Contexts of Alcohol's Harms from Others. *Alcohol & Alcoholism*, 56(6), 695-701. <https://doi.org/10.1093/alcalc/agab006>
- Tamura, K., Langerman, S. D., Orstad, S. L., Neally, S. J., Andrews, M. R., Ceasar, J. N., ... & Powell-Wiley, T. M. (2020). Physical activity-mediated associations between perceived neighborhood social environment and depressive symptoms among Jackson Heart Study participants. *International Journal of Behavioral Nutrition and Physical Activity*, 17, 1-13. <https://doi.org/10.1186/s12966-020-00991-y>
- Tamura, M., Hattori, S., Tsuji, T., Kondo, K., Hanazato, M., Tsuno, K., & Sakamaki, H. (2021). Community-level participation in volunteer groups and individual depressive symptoms in Japanese older people: a three-year longitudinal multilevel analysis using JAGES data. *International Journal of Environmental Research and Public Health*, 18(14), 7502. <https://doi.org/10.3390/ijerph18147502>
- Tanjasiri, S. P., Lew, R., Kuratani, D. G., Wong, M., & Fu, L. (2011). Using photovoice to assess and promote environmental approaches to tobacco control in AAPI communities. *Health Promotion Practice*, 12(5), 654-665. <https://doi.org/10.1177/1524839910369987>
- Tapp, H., White, L., Steuerwald, M., & Dulin, M. (2013). Use of community-based participatory research in primary care to improve healthcare outcomes and disparities in care. *Journal of Comparative Effectiveness Research*, 2(4), 405-419. <https://doi.org/10.2217/ce.13.45>
- Tartia, J. (2018). Driving in/between Places: Rhythms, Urban Spaces and Everyday Driving Routes. *Architectural Research in Finland*, 2(1), 36-52.
- Tashakkori, A., & Teddlie, C. (Eds.). (2010). *Sage handbook of mixed methods in social & behavioral research*. Sage.
- Taylor, R. B. (1997). Social order and disorder of street blocks and neighborhoods: ecology, microecology, and the systemic model of social disorganization. *Journal of Research in Crime and Delinquency*, 34(1), 113-155. <https://doi.org/10.1177/0022427897034001006>
- Teague, S., Youssef, G. J., Macdonald, J. A., Sciberras, E., Shatte, A., Fuller-Tyszkiewicz, M., ... & SEED Lifecourse Sciences Theme. (2018). Retention strategies in longitudinal cohort studies: A systematic review and meta-analysis. *BMC Medical Research Methodology*, 18(1), 1-22. <https://doi.org/10.1186/s12874-018-0586-7>
- The Lancet Public Health. (2022). The cost of living: an avoidable public health crisis. *The Lancet Public Health*, 7(6), e485. [https://doi.org/10.1016/S2468-2667\(22\)00120-7](https://doi.org/10.1016/S2468-2667(22)00120-7)

- The Mental Health Taskforce. (2016). *The Five Year Forward View for Mental Health. A report from the independent mental health taskforce to the NHS in England*. Available at: <https://www.england.nhs.uk/wp-content/uploads/2016/02/Mental-Health-Taskforce-FYFV-final.pdf> (Accessed 12 June 2024)
- Theall, K. P., Scribner, R., Cohen, D., Bluthenthal, R. N., Schonlau, M., & Farley, T. A. (2009). Social capital and the neighborhood alcohol environment. *Health & Place*, 15(1), 323-332. <https://doi.org/10.1016/j.healthplace.2008.06.001>
- Thompson, C. W., Roe, J., Aspinall, P., Mitchell, R., Clow, A., & Miller, D. (2012). More green space is linked to less stress in deprived communities: Evidence from salivary cortisol patterns. *Landscape and Urban Planning*, 105(3), 221-229. <https://doi.org/10.1016/j.landurbplan.2011.12.015>
- Thompson, C., Milton, S., Egan, M., & Lock, K. (2018). Down the local: A qualitative case study of daytime drinking spaces in the London Borough of Islington. *International Journal of Drug Policy*, 52, 1-8. <https://doi.org/10.1016/j.drugpo.2017.11.019>
- Thornton, L. E., Schroers, R. D., Lamb, K. E., Daniel, M., Ball, K., Chaix, B., ... & Coffee, N. T. (2022). Operationalising the 20-minute neighbourhood. *International Journal of Behavioral Nutrition and Physical Activity*, 19(1), 1-18. <https://doi.org/10.1186/s12966-021-01243-3>
- Tofani, A. A., Lamarca, G. D. A., Sheiham, A., & Vettore, M. V. (2015). The different effects of neighbourhood and individual social capital on health-compromising behaviours in women during pregnancy: a multi-level analysis. *BMC Public Health*, 15, 1-17. <https://doi.org/10.1186/s12889-015-2213-4>
- Touvier, M., Druet-Pecollo, N., Kesse-Guyot, E., Andreeva, V. A., Galan, P., Hercberg, S., & Latino-Martel, P. (2014). Demographic, socioeconomic, disease history, dietary and lifestyle cancer risk factors associated with alcohol consumption. *International Journal of Cancer*, 134(2), 445-459. <https://doi.org/10.1002/ijc.28365>
- Tovmasyan, A., Monk, R. L., Sawicka, I., & Heim, D. (2022). Positive but not negative affect is associated with increased daily drinking likelihood in non-clinical populations: systematic review and meta-analyses. *The American Journal of Drug and Alcohol Abuse*, 48(4), 382-396. <https://doi.org/10.1080/00952990.2022.2082300>
- Tracy, K., & Wallace, S. P. (2016). Benefits of peer support groups in the treatment of addiction. *Substance Abuse and Rehabilitation*, 143-154. <https://doi.org/10.2147/SAR.S81535>
- Tran, K. T., Robertson, K., & Thyne, M. (2020). Students' perceptions of barriers to moderate drinking: A comparison between a wet and a dry drinking culture. *Journal of Social Marketing*, 10(1), 105-124. <https://doi.org/10.1108/JSOCM-09-2018-0102>
- Treur, J. L., Munafò, M. R., Logtenberg, E., Wiers, R. W., & Verweij, K. J. (2021). Using Mendelian randomization analysis to better understand the relationship between mental health and substance use: a systematic review. *Psychological Medicine*, 51(10), 1593-1624. <https://doi.org/10.1017/S003329172100180X>
- Tsai, D.-H., Foster, S., Gmel, G., & Mohler-Kuo, M. (2020). Social cohesion, depression, and substance use severity among young men: Cross-sectional and longitudinal analyses from a Swiss cohort. *Addictive Behaviors*, 110, 106510. <https://doi.org/10.1016/j.addbeh.2020.106510>
- Tseliou, F., & Ashfield-Watt, P. (2022). The association between resilience resources, contextual factors and mental health status: a national population-based study. *BMC Public Health*, 22(1), 602. <https://doi.org/10.1186/s12889-022-13013-2>
- Tucker, J. A., Chandler, S. D., & Witkiewitz, K. (2020). Epidemiology of recovery from alcohol use disorder. *Alcohol Research: Current Reviews*, 40(3). <https://doi.org/10.35946/arcr.v40.3.02>
- Tucker, J. S., Pollard, M. S., & Green Jr, H. D. (2021). Associations of social capital with binge drinking in a national sample of adults: The importance of neighborhoods and networks. *Health & Place*, 69, 102545. <https://doi.org/10.1016/j.healthplace.2021.102545>

- Tunstall, B. J., Carmack, S. A., Koob, G. F., & Vendruscolo, L. F. (2017). Dysregulation of brain stress systems mediates compulsive alcohol drinking. *Current Opinion in Behavioral Sciences*, 13, 85-90. <https://doi.org/10.1016/j.cobeha.2016.10.006>
- Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the Social Group: A Self-Categorization Theory*. Basil Blackwell.
- Turner, L., Mermelstein, R., & Flay, B. (2004). Individual and contextual influences on adolescent smoking. *Annals of the New York Academy of Sciences*, 1021(1), 175-197. <https://doi.org/10.1196/annals.1308.023>
- Turner, S., Mota, N., Bolton, J., & Sareen, J. (2018). Self-medication with alcohol or drugs for mood and anxiety disorders: A narrative review of the epidemiological literature. *Depression and Anxiety*, 35(9), 851-860. <https://doi.org/10.1002/da.22771>
- Twigg, L., Taylor, J., & Mohan, J. (2010). Diversity or disadvantage? Putnam, Goodhart, ethnic heterogeneity, and collective efficacy. *Environment and Planning A*, 42(6), 1421-1438. <https://doi.org/10.1068/a42287>
- UK SMART Recovery. (n.d.). *The SMART Recovery programme*. Available at: <https://smartrecovery.org.uk/smart-recovery-programme/>
- Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology*, 11(3), 201-230. [https://doi.org/10.1016/S0272-4944\(05\)80184-7](https://doi.org/10.1016/S0272-4944(05)80184-7)
- United Nations. (2015). Transforming our world: the 2030 Agenda for sustainable development. Available at: <https://sdgs.un.org/publications/transforming-our-world-2030-agenda-sustainable-development-17981>
- United Nations. (n.d.). *The 17 goals*. Available at: <https://sdgs.un.org/goals> (Accessed 12 June 2024)
- Vaeth, P. A. C., Caetano, R., & Mills, B. A. (2015). Binge Drinking and Perceived Neighborhood Characteristics Among Mexican Americans Residing on the U.S.-Mexico Border. *Alcoholism: Clinical & Experimental Research*, 39(9), 1727-1733. <https://doi.org/10.1111/acer.12818>
- Vaeth, P. A., Caetano, R., & Canino, G. (2019). Neighborhood factors, drinking behavior, and alcohol use disorder in San Juan, Puerto Rico. *American Journal of Orthopsychiatry*, 89(5), 579. <https://doi.org/10.1037/ort0000402>
- Vaillant, G. E. (2005). Alcoholics Anonymous: cult or cure?. *Australian & New Zealand Journal of Psychiatry*, 39(6), 431-436. <https://doi.org/10.1080/j.1440-1614.2005.01600.x>
- Veenstra, G. (2005). Location, location, location: contextual and compositional health effects of social capital in British Columbia, Canada. *Social Science & Medicine*, 60(9), 2059-2071. <https://doi.org/10.1016/j.socscimed.2004.08.064>
- Venegas, A., Donato, S., Meredith, L. R., & Ray, L. A. (2021). Understanding low treatment seeking rates for alcohol use disorder: a narrative review of the literature and opportunities for improvement. *The American Journal of Drug and Alcohol Abuse*, 47(6), 664-679. <https://doi.org/10.1080/00952990.2021.1969658>
- Venkatesh, V., Brown, S. A., & Bala, H. (2013). Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems. *MIS Quarterly*, 21-54.
- Verhaeghe, P. P., & Tampubolon, G. (2012). Individual social capital, neighbourhood deprivation, and self-rated health in England. *Social Science & Medicine*, 75(2), 349-357. <https://doi.org/10.1016/j.socscimed.2012.02.057>
- Verhulst, B., Neale, M. C., & Kendler, K. S. (2015). The heritability of alcohol use disorders: a meta-analysis of twin and adoption studies. *Psychological Medicine*, 45(5), 1061-1072. <https://doi.org/10.1017/S0033291714002165>
- Vermunt, J. K. (2010). Latent class modeling with covariates: Two improved three-step approaches. *Political Analysis*, 18(4), 450-469. <https://doi.org/10.1093/pan/mpq025>
- Vermunt, J. K., & Magidson, J. (2016). *Latent GOLD 6.0* [Computer software]. Belmont, MA: Statistical Innovations Inc.

- Vermunt, J. K., & Magidson, J. (2016). *Technical guide for Latent GOLD 5.1: Basic, advanced, and syntax*. Statistical Innovations Inc. Retrieved from <https://www.statisticalinnovations.com/wp-content/uploads/LGtechnical.pdf>
- Vermunt, J. K., & Magidson, J. (2021). How to perform three-step latent class analysis in the presence of measurement non-invariance or differential item functioning. *Structural Equation Modeling: A Multidisciplinary Journal*, 28(3), 356-364. <https://doi.org/10.1080/10705511.2020.1818084>
- Vigdal, M. I., Moltu, C., Bjørnstad, J., & Selseng, L. B. (2022). Social recovery in substance use disorder: A metasynthesis of qualitative studies [Review]. *Drug and Alcohol Review*, 41(4), 974-987. <https://doi.org/10.1111/dar.13434>
- Villalonga-Olives, E., & Kawachi, I. (2017). The dark side of social capital: A systematic review of the negative health effects of social capital. *Social Science & Medicine*, 194, 105-127. <https://doi.org/10.1016/j.socscimed.2017.10.020>
- Villalonga-Olives, E., Almansa, J., Shaya, F., & Kawachi, I. (2020). Perceived social capital and binge drinking in older adults: The Health and Retirement Study, US data from 2006–2014. *Drug and Alcohol Dependence*, 214, 108099. <https://doi.org/10.1016/j.drugalcdep.2020.108099>
- Villalonga-Olives, E., Wind, T. R., & Kawachi, I. (2018). Social capital interventions in public health: A systematic review. *Social Science & Medicine*, 212, 203-218. <https://doi.org/10.1016/j.socscimed.2018.07.022>
- Vincent, W., Del Río-González, A. M., Neilands, T. B., & Bowleg, L. (2023). Resilience and Its Limits: The Roles of Individual Resilience, Social Capital, Racial Discrimination, and Binge Drinking on Sexual Behavior Among Black Heterosexual Men. *Archives of Sexual Behavior*, 52(4), 1419-1434. <https://doi.org/10.1007/s10508-022-02488-0>
- Virgolino, A., Costa, J., Santos, O., Pereira, M. E., Antunes, R., Ambrósio, S., ... & Vaz Carneiro, A. (2022). Lost in transition: a systematic review of the association between unemployment and mental health. *Journal of Mental Health*, 31(3), 432-444. <https://doi.org/10.1080/09638237.2021.2022615>
- Visser, K., Bolt, G., Finkenauer, C., Jonker, M., Weinberg, D., & Stevens, G. W. (2021). Neighbourhood deprivation effects on young people's mental health and well-being: A systematic review of the literature. *Social Science & Medicine*, 270, 113542. <https://doi.org/10.1016/j.socscimed.2020.113542>
- Volkow, N. D., Koob, G. F., & McLellan, A. T. (2016). Neurobiologic advances from the brain disease model of addiction. *New England Journal of Medicine*, 374(4), 363-371. <https://doi.org/10.1056/NEJMr1511480>
- Wallace, S., Nazroo, J., & Bècares, L. (2016). Cumulative effect of racial discrimination on the mental health of ethnic minorities in the United Kingdom. *American Journal of Public Health*, 106(7), 1294-1300. <https://doi.org/10.2105/AJPH.2016.303121>
- Wallerstein, N., & Duran, B. (2010). Community-based participatory research contributions to intervention research: the intersection of science and practice to improve health equity. *American Journal of Public Health*, 100(S1), S40-S46.
- Walsh, D., Bendel, N., Jones, R., & Hanlon, P. (2010). It's not 'just deprivation': why do equally deprived UK cities experience different health outcomes?. *Public Health*, 124(9), 487-495. <https://doi.org/10.1016/j.puhe.2010.02.006>
- Wan, C., Shen, G. Q., & Choi, S. (2021). Underlying relationships between public urban green spaces and social cohesion: A systematic literature review. *City, Culture and Society*, 24, 100383. <https://doi.org/10.1016/j.ccs.2021.100383>
- Wang, C. C., Yi, W. K., Tao, Z. W., & Carovano, K. (1998). Photovoice as a participatory health promotion strategy. *Health Promotion International*, 13(1), 75-86. <https://doi.org/10.1093/heapro/13.1.75>
- Wang, C., & Burris, M. A. (1994). Empowerment through photo novella: Portraits of participation. *Health Education Quarterly*, 21(2), 171-186. <https://doi.org/10.1177/109019819402100204>

- Wang, C., & Burris, M. A. (1997). Photovoice: Concept, methodology, and use for participatory needs assessment. *Health Education & Behavior*, 24(3), 369-387. <https://doi.org/10.1177/109019819702400309>
- Wang, J., Huang, C., Xu, L., & Zhang, J. (2023). Drinking into friends: Alcohol drinking culture and CEO social connections. *Journal of Economic Behavior & Organization*, 212, 982-995. <https://doi.org/10.1016/j.jebo.2023.06.021>
- Wang, J., Mann, F., Lloyd-Evans, B., Ma, R., & Johnson, S. (2018). Associations between loneliness and perceived social support and outcomes of mental health problems: a systematic review. *BMC Psychiatry*, 18, 1-16. <https://doi.org/10.1186/s12888-018-1736-5>
- Wang, X., Auchincloss, A. H., Barber, S., Mayne, S. L., Griswold, M. E., Sims, M., & Roux, A. V. D. (2017). Neighborhood social environment as risk factors to health behavior among African Americans: The Jackson Heart Study. *Health & Place*, 45, 199-207. <https://doi.org/10.1016/j.healthplace.2017.04.002>
- Wang, Y., McKee, M., Torbica, A., & Stuckler, D. (2019). Systematic literature review on the spread of health-related misinformation on social media. *Social Science & Medicine*, 240, 112552. <https://doi.org/10.1016/j.socscimed.2019.112552>
- Wardell, J. D., Kempe, T., Rapinda, K. K., Single, A., Bilevicius, E., Frohlich, J. R., ... & Keough, M. T. (2020). Drinking to cope during COVID-19 pandemic: The role of external and internal factors in coping motive pathways to alcohol use, solitary drinking, and alcohol problems. *Alcoholism: Clinical and Experimental Research*, 44(10), 2073-2083. <https://doi.org/10.1111/acer.14425>
- Wardenaar, K. (2020). Latent Class Growth Analysis and Growth Mixture Modeling using R: A tutorial for two R-packages and a comparison with Mplus. *PsyArXiv*. <https://doi.org/10.31234/osf.io/m58wx>
- Watson, A. L., & Sher, K. J. (1998). Resolution of alcohol problems without treatment: Methodological issues and future directions of natural recovery research. *Clinical Psychology: Science and Practice*, 5(1), 1-18. <https://doi.org/10.1111/j.1468-2850.1998.tb00131.x>
- Webel, A. R., Smith, C., Perazzo, J., Phillips, J. C., Al Battashi, H., & Dawson-Rose, C. (2020). The relationships among social capital, HIV self-management, and substance use in women. *Western Journal of Nursing Research*, 42(1), 4-13. <https://doi.org/https://doi.org/10.1177/0193945919842874>
- Weed, M. (2008). A potential method for the interpretive synthesis of qualitative research: Issues in the development of 'meta-interpretation.' *International Journal of Social Research Methodology: Theory & Practice*, 11(1), 13-28. <https://doi.org/10.1080/13645570701401222>
- Weitzman, E. R., & Chen, Y. Y. (2005). Risk modifying effect of social capital on measures of heavy alcohol consumption, alcohol abuse, harms, and secondhand effects: national survey findings. *Journal of Epidemiology & Community Health*, 59(4), 303-309. <http://doi.org/10.1136/jech.2004.024711>
- Wells, G. A., Shea, B., O'Connell, D., Peterson, J., Welch, V., Losos, M., & Tugwell, P. (2011). The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomised studies in meta-analyses. Available at: https://www.ohri.ca/programs/clinical_epidemiology/oxford.asp (Accessed 16 February 2024)
- Weston, S., Honor, S., & Best, D. (2018). A Tale of Two Towns: A Comparative Study Exploring the Possibilities and Pitfalls of Social Capital among People Seeking Recovery from Substance Misuse. *Substance Use & Misuse*, 53(3), 490-500. <https://doi.org/10.1080/10826084.2017.1341925>
- Whitley, R., & McKenzie, K. (2005). Social capital and psychiatry: review of the literature. *Harvard Review of Psychiatry*, 13(2), 71-84. <https://doi.org/10.1080/10673220590956474>

- Wilkinson, C. (2013). Public information and education campaigns. In P. Boyle, P. Boffetta, A. Lowenfels, H. Burns, O. Brawley, W. Zatonski & J. Rehm (Eds.), *Alcohol: Science, policy and public health* (1st ed., pp. 390-395). Oxford: Oxford University Press.
- Williams, E. C., Kivlahan, D. R., Saitz, R., Merrill, J. O., Achtmeyer, C. E., McCormick, K. A., & Bradley, K. A. (2006). Readiness to change in primary care patients who screened positive for alcohol misuse. *The Annals of Family Medicine*, 4(3), 213-220. <https://doi.org/10.1370/afm.542>
- Wilson, E. O. (1984). *Biophilia The Human Bond with Other Species*. Cambridge, MA: Harvard University Press.
- Wirral Intelligence Service. (2019, November). *Indices of multiple deprivation for Wirral (2019)*. Available at: <https://www.wirralintelligenceservice.org/our-jsna/inequalities/wirral-indices-of-deprivation/> (Accessed 12 June 2024)
- Woodall, D., & Boeri, M. (2014). "When You Got Friends in Low Places, You Stay Low": Social Networks and Access to Resources for Female Methamphetamine Users in Low-Income Suburban Communities [Article]. *Journal of Drug Issues*, 44(3), 321-339. <https://doi.org/10.1177/0022042613511440>
- Woodhouse, J. (2020). *Alcohol: Minimum pricing*. (Briefing Paper Number 5021). House of Commons Library. Available at: <https://researchbriefings.files.parliament.uk/documents/SN05021/SN05021.pdf> (Accessed 12 June 2020)
- World Health Organization. (1986). *Ottawa charter for health promotion, 1986* (No. WHO/EURO: 1986-4044-43803-61677). World Health Organization. Regional Office for Europe. Available at: <https://iris.who.int/handle/10665/349652> (Accessed 12 June 2024)
- World Health Organization. (2010). *Global strategy to reduce the harmful use of alcohol*. Available at: <https://www.who.int/teams/mental-health-and-substance-use/alcohol-drugs-and-addictive-behaviours/alcohol/governance/global-alcohol-strategy#:~:text=During%20the%20Sixty%2Dthird%20session,alcohol%20by%20adopted%20resolution%20WHA63> (Accessed 18 July 2024)
- World Health Organization. (2017). Best buys and other recommended interventions for the prevention and control of noncommunicable diseases. <https://apps.who.int/iris/bitstream/handle/10665/259232/WHO-NMH-NVI-17.9-eng.pdf;sequence=1>
- World Health Organization. (2018). *Global status report on alcohol and health 2018*. Geneva: World Health Organization. Available at: <https://www.who.int/publications/i/item/9789241565639> (Accessed 12 June 2024)
- World Health Organization. (2019a). *International statistical classification of diseases and related health problems (11th ed.)*. <https://icd.who.int/>
- World Health Organization. (2019b). The SAFER technical package: five areas of intervention at national and subnational levels. Geneva: World Health Organization. Available at: <https://www.who.int/publications/i/item/9789241516419> (Accessed 12 June 2024)
- World Health Organization. (2021). Making the WHO European Region SAFER: developments in alcohol control policies, 2010–2019. Available at: <https://www.who.int/europe/publications/i/item/9789289055048> (Accessed July 18 2024)
- World Health Organization. (2023). Working together for equity and healthier populations: sustainable multisectoral collaboration based on Health in All Policies approaches. Geneva: World Health Organization. Available at: <https://www.who.int/publications/i/item/9789240067530> (Accessed 18 July 2024)
- World Health Organization. (2024). Global alcohol action plan 2022–2030. Geneva: World Health Organization. Available at: <https://iris.who.int/bitstream/handle/10665/376939/9789240090101-eng.pdf?sequence=1> (Accessed 1 August 2024)

- Wu, Y. H., White, K., Fleischer, N. L., Cai, B., Chen, S. C., & Moore, S. (2018). Network-based and cohesion-based social capital and variations in depressive symptoms among Taiwanese adults. *International Journal of Social Psychiatry*, 64(8), 726-736. <https://doi.org/10.1177/0020764018808326>
- Wurpts, I. C., & Geiser, C. (2014). Is adding more indicators to a latent class analysis beneficial or detrimental? Results of a Monte-Carlo study. *Frontiers in Psychology*, 5, Article 920. <https://doi.org/10.3389/fpsyg.2014.00920>
- Wyper, G. M., Mackay, D. F., Fraser, C., Lewsey, J., Robinson, M., Beeston, C., & Giles, L. (2023). Evaluating the impact of alcohol minimum unit pricing on deaths and hospitalisations in Scotland: a controlled interrupted time series study. *The Lancet*, 401(10385), 1361-1370. [https://doi.org/10.1016/S0140-6736\(23\)00497-X](https://doi.org/10.1016/S0140-6736(23)00497-X)
- Xie, L., Pinto, J., & Zhong, B. (2022). Building community resilience on social media to help recover from the COVID-19 pandemic. *Computers in Human Behavior*, 134, 107294. <https://doi.org/10.1016/j.chb.2022.107294>
- Yamamoto, M., & Ran, W. (2013). Drug abuse violations in communities: Community newspapers as a macro-level source of social control. *Journalism & Mass Communication Quarterly*, 90(4), 629-651. <https://doi.org/10.1177/1077699013503164>
- Yang, P., Tao, R., He, C., Liu, S., Wang, Y., & Zhang, X. (2018). The risk factors of the alcohol use disorders—through review of its comorbidities. *Frontiers in Neuroscience*, 12, 303. <https://doi.org/10.3389/fnins.2018.00303>
- Yang, X. Y. (2017). Marijuana Use at Early Midlife and the Trajectories of Social Bonds [Article]. *Journal of Developmental and Life-Course Criminology*, 3(3), 284-303. <https://doi.org/10.1007/s40865-017-0061-x>
- Yang, Y., Li, M., & Lin, H.-C. (2022). Parental psychological control, social capital, substance use, and driving under the influence among college students: Sex differences. *Journal of Child & Family Studies*, 31(5), 1207-1219. <https://doi.org/10.1007/s10826-021-02036-9>
- Yang, Y., Wang, S., Chen, L., Luo, M., Xue, L., Cui, D., & Mao, Z. (2020). Socioeconomic status, social capital, health risk behaviors, and health-related quality of life among Chinese older adults. *Health and Quality of Life Outcomes*, 18, 1-8. <https://doi.org/10.1186/s12955-020-01540-8>
- Young, R. M., Oei, T. P., & Knight, R. G. (1990). The tension reduction hypothesis revisited: An alcohol expectancy perspective. *British Journal of Addiction*, 85(1), 31-40. <https://doi.org/10.1111/j.1360-0443.1990.tb00621.x>
- Zemore, S. E., Lui, C., Mericle, A., Hemberg, J., & Kaskutas, L. A. (2018). A longitudinal study of the comparative efficacy of Women for Sobriety, LifeRing, SMART Recovery, and 12-step groups for those with AUD. *Journal of Substance Abuse Treatment*, 88, 18-26. <https://doi.org/10.1016/j.jsat.2018.02.004>
- Zhang, X., Cook, P. A., Lisboa, P. J., Jarman, I. H., & Bellis, M. A. (2013). The effects of deprivation and relative deprivation on self-reported morbidity in England: an area-level ecological study. *International Journal of Health Geographics*, 12, 1-11. <https://doi.org/10.1186/1476-072X-12-5>
- Zimbardo, P. G., & Boyd, J. N. (2015). Putting time in perspective: A valid, reliable individual-differences metric. In M. Stolarski, N. Fieulaine, & W. van Beek (Eds.), *Time perspective theory: Review, research and application: Essays in honor of Philip G. Zimbardo* (pp. 17–55). Springer International Publishing/Springer Nature. https://doi.org/10.1007/978-3-319-07368-2_2

Appendix 1 – Modified Newcastle-Ottawa Scale (cohort version) adapted from Wells et al (2011) for quality assessment of longitudinal studies included in Study 1

COHORT STUDIES

Note: A study can be awarded a maximum of one star for each numbered item within the Selection and Outcome categories. A maximum of two stars can be given for Comparability. (Adaptations for the Study 1 review specified in blue font)

Selection

- 1) Representativeness of the exposed cohort (representativeness of general population adults)
 - a) truly representative of the average _____ (describe) in the community ✱ Random or stratified sampling
 - b) somewhat representative of the average _____ in the community ✱ Random/stratified sampling of specific subgroup of the general population (e.g. based on age, gender)
 - c) selected group of users eg nurses, volunteers Opportunity sample or very specific group of participants drawn from general population of a specific area (e.g. one university, one county/state)
 - d) no description of the derivation of the cohort
- 2) Selection of the non-exposed cohort
 - a) drawn from the same community as the exposed cohort ✱
 - b) drawn from a different source
 - c) no description of the derivation of the non-exposed cohort
- 3) Ascertainment of exposure (exposure = neighbourhood factor)
 - a) secure record (eg surgical records) ✱
 - b) structured interview ✱
 - c) written self report
 - d) no description
- 4) Demonstration that outcome (alcohol outcome) of interest was not present at start of study
 - a) yes ✱
 - b) no

Item 4 was removed because longitudinal studies did not have to examine change in alcohol use over time to be eligible for inclusion, there was no explicit focus on the onset of drinking, and there was variation in the alcohol outcomes measured across the included studies.

Comparability

- 1) Comparability of cohorts on the basis of the design or analysis
 - a) study controls for _____ (select the most important factor – individual

sociodemographics, e.g. age, sex, education, income) ✱

b) study controls for any additional factor ✱ (This criteria could be modified to indicate specific control for a second important factor - any other lifestyle, social capital or neighbourhood factors.)

Outcome

Outcome = alcohol use. Likely to only be self-reported so give 1 star if use validated measure (e.g. AUDIT/DSM/CAGE) or no stars if based on basic quantity/frequency measures or recommended limits

1) Assessment of outcome

a) ~~independent blind assessment~~ Validated measure ✱ e.g. AUDIT, CAGE, diagnostic tools based on DSM criteria

b) record linkage ✱

c) self report e.g. basic quantity/frequency measures, single item assessing drinker status, alcohol consumption in accordance with drinking guidelines (such as NIAAA, CDC)

d) no description

2) Was follow-up long enough for outcomes to occur

a) yes (select an adequate follow up period for outcome of interest – 1 year) ✱

b) no

3) Adequacy of follow up of cohorts

a) complete follow up - all subjects accounted for ✱

b) subjects lost to follow up unlikely to introduce bias - small number lost - > 60% % (select an adequate %) follow up, or description provided of those lost) ✱

c) follow up rate < 60% % (select an adequate %) and no description of those lost

d) no statement

Appendix 2 – Modified Newcastle-Ottawa Scale (cross-sectional version) adapted from Modesti et al (2016) for quality assessment of cross-sectional studies included in Study 1

CROSS-SECTIONAL STUDIES

(Adaptations for the Study 1 review specified in blue font)

Selection: (Maximum 5 stars)

1) Representativeness of the sample:

- a) Truly representative of the average in the target population. * (all subjects or random sampling; **general population sample**)
- b) Somewhat representative of the average in the target population. *
- c) Selected group of users.
- d) No description of the sampling strategy.

2) Sample size:

- a) Justified and satisfactory. * (**Satisfactory sample size = >600; justification: 600 is smallest size of a Census block**)
- b) Not justified.

3) Non-respondents:

- a) Comparability between respondents and non-respondents characteristics is established, and the response rate is satisfactory. * (**satisfactory response rate = 60% [Fincham, 2008]; or response rate <60% and differences between respondents and non-respondents reported/adjustments made for this**)
- b) The response rate is unsatisfactory, or the comparability between respondents and non-respondents is unsatisfactory.
- c) No description of the response rate or the characteristics of the responders and the non-responders.

4) Ascertainment of the exposure (**exposure = neighbourhood factor**):

- a) Validated measurement tool. ** (**gets 2 stars if cites source of validated scale OR reports all assessment items AND reports factor analysis/Cronbach alpha of >0.7 [indicates acceptable internal consistency]**)
- b) Non-validated measurement tool, but the tool is available or described.*
- c) No description of the measurement tool.

Comparability: (Maximum 2 stars)

1) The subjects in different outcome groups are comparable, based on the study design or analysis. Confounding factors are controlled.

- a) The study controls for the most important factor (select one – **individual sociodemographic factors**). *
- b) The study control for any additional factor (**any other lifestyle factors, neighbourhoods factors [including clustering], or social capital relating to individuals, networks, or neighbourhoods**). *

Outcome: (Maximum 3 stars) (**outcome = alcohol variable**)

Likely to only be self-reported so give 2 stars if use validated measure (e.g. AUDIT/DSM/CAGE) or 1 star if based on basic quantity/frequency measures or recommended limits)

1) Assessment of the outcome:

- a) ~~Independent blind assessment~~ Validated measure **
- b) Record linkage. **
- c) Self report * e.g. basic quantity/frequency measures, single item assessing drinker status, alcohol consumption in accordance with drinking guidelines (such as NIAAA, CDC)
- d) No description.

2) Statistical test:

- a) The statistical test used to analyze the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (p value). *
- b) The statistical test is not appropriate, not described, or incomplete.

Appendix 3 – Quality assessment of empirical studies included in Study 1

Quality assessment: Cross-sectional studies assessed with the modified Newcastle Ottawa Scale for cross-sectional studies (adapted from Modesti et al, 2016)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Selection (max 5)																			
Representativeness of sample	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*	-
Sample size	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Non-respondents	-	-	-	*	*	*	-	-	*	*	*	-	-	-	*	-	-	*	N/A
Ascertainment of exposure	*	**	-	**	**	**	*	*	**	*	-	*	*	*	**	*	**	**	**
Comparability (max 2)	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Outcome (max 3)																			
Assessment of outcome	**	*	*	**	*	*	**	*	*	*	*	**	*	*	*	*	*	*	*
Statistical test	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total score (%)	70	80	60	100	90	90	80	70	80	80	70	80	70	70	90	70	80	90	77.8

1. Ahern et al (2015)	11. Ng Fat et al (2017)
2. Chauhan et al (2016)	12. Nordmyr et al (2016)
3. de Gelder et al (2017)	13. Pavlova et al (2014)
4. Dupuis et al (2016)	14. Seid et al (2016)
5. Kuipers et al (2012)	15. Studer et al (2016)
6. Kuipers et al (2013)	16. Tamura et al (2020)
7. Larm et al (2016)	17. Tucker et al (2021)
8. Lê et al (2010)	18. Vincent et al (2023)
9. Lin et al (2012)	19. Yang et al (2022)
10. Mohnen et al (2012)	

Quality assessment: Cross-sectional studies assessed with the modified Newcastle Ottawa Scale for cross-sectional studies (adapted from Modesti et al, 2016)

	1	3	4	5	6	7	8
Selection (max 3)							
Representativeness of exposed cohort	*	*	-	*	*	*	*
Selection of non-exposed cohort	*	*	*	*	*	*	*
Ascertainment of exposure	*	-	-	-	-	-	-
Comparability (max 2)	**	**	**	**	**	**	**
Outcome (max 3)							
Assessment of outcome	-	-	-	-	-	-	-
Adequate follow-up interval(s)	*	*	*	*	*	*	*
Adequate follow-up rate	-	-	*	*	*	*	*
Total score (%)	75	62.5	62.5	75	75	75	75

1. Borgonovi (2010)
2. Kim et al (2020)
3. Perez et al (2022)
4. Ruiz et al (2019)
5. Tsai et al (2020)
6. Villalonga-Olives et al (2020)
7. Wang et al (2017)

Appendix 4 – Study 2 trajectory class characteristics

		Non-drinkers	Very-low-level drinkers	Low-level drinkers	Moderate drinkers	Borderliners	High-risk drinkers
Cluster Size		14.65%	11.70%	25.14%	15.12%	25.60%	7.78%
Covariates							
Membership in organisation(s)							
	Yes	39.80%	52.86%	55.09%	67.32%	56.24%	55.99%
	No	56.81%	44.03%	42.17%	30.50%	40.50%	40.40%
	Missing	3.39%	3.11%	2.74%	2.18%	3.26%	3.61%
Volunteer							
	Yes	18.69%	21.60%	24.76%	30.97%	21.13%	18.73%
	No	79.29%	77.48%	74.05%	68.31%	77.50%	79.84%
	Missing	2.02%	0.92%	1.19%	0.72%	1.37%	1.43%
Neighbourhood social cohesion							
	Mean	14.63	14.71	14.80	15.17	14.83	14.78
	Missing	3.83%	2.16%	2.94%	1.96%	2.49%	2.40%
GHQ							
	Mean	11.55	11.21	10.86	9.96	10.68	11.14
	Missing	0.86%	0.41%	0.26%	0.31%	0.15%	0.14%
Age (group)							
	18-34	21.22%	11.95%	20.49%	15.61%	25.57%	15.00%
	35-49	27.89%	22.85%	24.89%	25.06%	30.73%	36.86%
	50-64	23.51%	29.97%	26.82%	29.17%	28.90%	37.66%
	65+	27.38%	35.23%	27.79%	30.17%	14.80%	10.48%
	Missing	0%	0%	0%	0%	0%	0%
Gender							

Male	35.76%	29.50%	38.39%	43.49%	52.38%	70.83%
Female	64.24%	70.50%	61.61%	56.51%	47.62%	29.17%
Missing	0%	0%	0%	0%	0%	0%
Ethnicity						
White	53.08%	86.03%	87.82%	96.15%	92.67%	96.38%
Non-white	46.34%	13.63%	11.48%	3.53%	6.26%	3.26%
Missing	0.58%	0.35%	0.70%	0.33%	1.07%	0.36%
Religiosity						
Yes, religious	71.59%	60.33%	52.50%	48.12%	41.22%	33.99%
No, not religious	24.02%	36.10%	43.02%	47.39%	51.89%	60.80%
Missing	4.38%	3.57%	4.48%	4.49%	6.89%	5.21%
Employment status						
Unemployed	43.16%	48.64%	59.61%	61.25%	70.95%	73.95%
Employed	56.78%	51.33%	40.29%	38.66%	29.01%	26.06%
Missing	0.07%	0.02%	0.10%	0.08%	0.04%	-0.01%
Urbanicity						
Rural	12.94%	20.33%	21.96%	28.34%	23.19%	19.28%
Urban	87.06%	79.67%	78.04%	71.66%	76.81%	80.72%
Missing	0%	0%	0%	0%	0%	0%
Marital status						
Single/never married	24.30%	23.49%	27.63%	21.42%	35.35%	35.47%
Married/registered civil partnership	57.32%	54.26%	58.04%	67.24%	55.27%	53.14%
Divorced/widowed/separated	18.28%	22.26%	14.30%	11.32%	9.33%	11.28%
Missing	0.10%	-0.01%	0.03%	0.02%	0.05%	0.10%
Educational attainment						
Degree or higher	32.03%	37.45%	41.44%	55.16%	43.10%	39.26%

Post-secondary (A levels etc)	18.48%	16.79%	20.59%	17.84%	24.52%	25.63%
Secondary (GCSEs etc)	18.62%	20.29%	19.42%	15.99%	19.18%	21.80%
Other qualification	11.64%	11.40%	9.66%	6.95%	7.33%	8.78%
No qualification	18.96%	13.89%	8.72%	3.97%	5.76%	4.33%
Missing	0.27%	0.18%	0.18%	0.09%	0.11%	0.21%
Income						
Lowest income	42.92%	37.52%	30.31%	24.93%	25.44%	20.11%
Medium income	37.34%	36.79%	36.73%	30.74%	31.64%	28.77%
Highest income	19.68%	25.61%	32.88%	44.23%	42.87%	50.93%
Missing	0.07%	0.09%	0.09%	0.11%	0.05%	0.19%
Neighbourhood deprivation						
Lowest deprivation	21.08%	34.50%	39.76%	50.27%	41.18%	38.79%
Moderate deprivation	30.22%	36.81%	35.17%	36.18%	35.37%	36.66%
Highest deprivation	48.70%	28.69%	25.08%	13.54%	23.45%	24.56%
Missing	0%	0%	0%	0%	0%	0%

Appendix 5 – Ethical approval for Study 3



UREC Minimal Risk Registration Form

Only completed the Minimal Risk Registration Form once it has been established (and confirmed by the supervisor for student projects) that the study requires minimal risk registration. To determine whether the study requires minimal risk registration, please complete the [decision tool](#) (if you see the “welcome to Office” page, click “sign in”. At the Microsoft sign in page enter your [username@ljmu.ac.uk](#)). The completed minimal risk registration form must be emailed to [MinimalRiskUREC@ljmu.ac.uk](#) (for student projects, the email must be sent by the supervisor)

Supervisors must email the minimal risk registration form for their students, as this is the only way that the REC can confirm that it has been authorised by the supervisor. Once the supervisor has emailed the minimal risk registration form, assuming the form has been completed correctly, an ethical approval number will be emailed to the applicants within a day or two (no ethical review will be conducted).

Supervisors – please use the email template copied below, append the completed risks registration form and email to [MinimalRiskUREC@ljmu.ac.uk](#)

Dear UREC

Submission of minimal risk registration form

Student name:

Title of study:

Declaration:

1. I have read the [minimal ethical risk guiding principles](#) ([section D](#) of the registration form) and the completed minimal risk registration form and will be acting as the student investigator’s supervisor for this study.
2. I have discussed the ethical implications with the student and I am satisfied that a) the student clearly understand their obligations and the rights of participants, particularly as regards obtaining informed consent; b) the participant selection and recruitment procedures, including the recruitment documents to be provided and the manner of obtaining informed consent, are appropriate c) the student clearly understand their obligations to abide by the Data Protection Act (2018) and GDPR legislation when collection, processing and storing personal data
3. The [routine review and proportionate review filter questions](#) have been completed truthfully and accurately.
4. The proposal is viable and the student has appropriate skills to undertake the study.
5. Participant selection and recruitment procedures, including the [Information Sheet\(s\)](#) to be provided and the manner of obtaining informed consent, are appropriate and the ethical issues arising from the project have been addressed.

6. I confirm that the student has read an appropriate professional code of ethical practice or completed the [LJMU Research Ethics Training](#) and completed a risk assessment form where appropriate.
7. I understand that the study must not commence until confirmation of minimal risk registration has been received

Section A: General Information

A1. Title of the Study *[If the title is not self-explanatory to a lay person then a secondary title should be given to clarify and used in any participant facing documents]:*

Using photovoice to explore neighbourhood influences on drinking behaviours

Secondary title *[if required]*

N/A

A2. Principal Investigator (PI) *[Note that the in the case of postgraduate or undergraduate studies the student is designated the PI. For studies undertaken by staff inclusive of postdoctoral investigators and research assistants the staff member conducting the study is designated the PI.]*

Title First Name Surname

Status

School

LJMU username

LJMU Email address (e.g. j.bloggs@ljmu.ac.uk
NOT SPSJBLOG@ljmu.ac.uk)

Experience / Qualifications / training relevant to the co-applicant conducting/supervising the study

6.5 years research experience (including studying towards Masters/PhD plus research assistant role)
Participatory research workshop undertaken at London School of Economics in June 2022
PhotoVoice training scheduled to be undertaken 10th-12th October 2022

What is the role of this investigator?

Principal investigator / PhD student

- **The Principal Investigator (PI) has successfully completed the [LJMU Research Ethics Training](#) and a copy of the certificate of completion emailed to the PI has been appended.**

YES

[Please note all students MUST have completed the LJMU Research Ethics Training BEFORE they start to complete this form]

A3. Co-applicant 1 / Academic Supervisor 1 *[where the application is being submitted by a student, either undergraduate or postgraduate, details of their main dissertation supervisor must be included]*

Title Professor

First Name Harry

Surname Sumnall

Status Staff

School Public Health Institute (PHI)

LJMU username pbhsumn

LJMU Email address (e.g. j.bloggs@ljmu.ac.uk
NOT SPSJBLOG@ljmu.ac.uk)

H.Sumnall@ljmu.ac.uk

Experience / Qualifications / training relevant to the co-applicant conducting/supervising the study

20+ years substance use research

What is the role of this investigator?

PhD supervisor

[Where there are more than one co-applicants, please append an additional page to your application containing the relevant details]

SECTION B – STUDY OVERVIEW

B1. Anticipated start date for the collection of data?

31 October 2022

B2. Study Overview: Briefly describe your study/project, as you would to a potential participant, highlighting the aims of your study, who your participants are (type of people rather than individual names), how you will recruit them and what will be asked of them (Please write in plain English (comprehensible to a lay person), avoid abbreviations/explain technical terms and try to use no more than 50 words for each section).

B2a. What are the aims of your study? Explain the principal question and the specific objectives of the study.

The aim of the study is to explore how Liverpool residents wanting to change their drinking behaviours perceive their neighbourhood environments to influence alcohol use. Specific objectives of the study are:

- a) To explore specific neighbourhood barriers and facilitators to reduced alcohol consumption in residents of high and low socioeconomic status areas;
- b) To explore perceptions of gentrification in Liverpool and its perceived impact on drinking practices;
- c) To investigate residents' perceptions of how the neighbourhood built and social environments can be improved to mitigate alcohol harms;
- c) To disseminate findings at a public exhibition to generate a shared understanding between Liverpool residents, researchers, and local community stakeholders about how neighbourhood environments impact drinking behaviours.

B2b. Who are your potential participants? This should outline any specific criteria participants must meet in order to be eligible take part (e.g. age, ethnicity, gender, members of a specific group etc.)

Potential participants will: be aged 35-60; currently drink alcohol and have considered reducing their alcohol consumption; not be alcohol dependent or engaged with/seeking alcohol treatment; live in Liverpool and have lived there for at least 5 years; speak English fluently.

B2c. How will participants be identified, approached and recruited? For example, if approaching potential participants in person you should explain the circumstances in which this will take place or if approaching potential participants by email/telephone you should explain how you will know who to contact and explain whether you will have legitimate access to personal data and contact details or whether you will ask a gatekeeper to identify and initially approach potential participants on your behalf (in order to abide by GDPR)

Participants will be recruited via community centres/groups based in two different areas of Liverpool. Advertisements (e.g., posters) will be posted at the centres with permission from the organisation. Permission will be obtained via a telephone call or email to contacts named on organisational websites. Please note that the study is not using gatekeepers to recruit participants. The advertisements will contain the principal investigator's contact details (university email address and contact number for a temporary

mobile phone) for interested individuals to get in touch regarding participation. If interest in the study is low, the principal investigator will attend the centre to recruit potential participants in person.

B2d. What will participation involve? Briefly explain how each data collection method, will be used to collect data. This should include what participants will be asked to do, how, when, where, how often, for how long etc. and an example of the types of questions they may be asked.

At an initial workshop (lasting approximately 60-90 minutes in total) held at the community centre(s), participants will be given a project overview and some short questionnaires to complete. The questionnaires assess their sociodemographic characteristics, area of residence (e.g., Anfield) and length of residence at current address, mental health (12-item Short General Health Questionnaire, GHQ-12), alcohol use (10-item Alcohol Use Disorders Identification Test, AUDIT), and neighbourhood perceptions (Buckner's Neighbourhood Cohesion Instrument, NCI, adapted by Fone et al, 2007). They will take part in informal discussions to share ideas about their neighbourhoods, receive basic ethical photography training, and be allocated a camera if necessary. They will then complete a photography task independently over 4 weeks, which involves taking photos of the points discussed at the workshop (or new ideas) regarding neighbourhood influences on drinking practices. The photographs will be discussed at a virtual or in-person interview/focus group at a session held in their community centre from which they were recruited. The duration of this session depends on the size of the group and content of the photographs but it is anticipated to last approximately 1 hour. This session will be audio-recorded and transcribed before being anonymised and deleted. After the interview/focus group, participants will each receive a £50 Love2Shop voucher for their participation and be informed that they may be contacted in the future with an invitation to a public exhibition, which will display some of the photographs, captions and study findings.

B3. Confirm which of the following consent processes will be used:

Please note: If a consent process is selected that does not correspond to the method/s indicated in B2c your registration form will be invalid.

a. Written Consent: A written description of the study will be provided to all potential participants and written consent will be recorded in either paper or electronic form in advance of participation	YES
b. Verbal Consent: Written information and consent is not practical, or not appropriate, so I will follow LJMU guidance on providing information and gaining consent from participants verbally	NO
c. Anonymous submission of survey/questionnaire/app based research tool data: A written description of the study will be provided to all potential participants and it will be made clear that the submission of a completed survey/questionnaire/app data implies consent	NO
d. Non-invasive observations that do not involve any interaction with participants and no identifying information will be recorded.	NO

B4. Does the study involve the collection and/or use of personally identifiable information at any point during the study? Personally identifiable information is any data collected during the course of the study which could potentially lead to the identification of an individual. Please see the LJMU guidance for examples of the type of data which could be considered personally identifiable. **Please note:** this includes audio recordings such as interview recordings.

Please indicate which of the following applies:

a. The study involves the collection and/or use of personally identifiable information

YES

b. Personally identifiable information will only be obtained in order to contact potential participants (e.g. using phone numbers/ email addresses) but no identifiable information will be collected beyond this point and it will not be possible to link any study data to participants.

NO

c. No personally identifiable data will be collected and/or used for this study

NO

SECTION C – DECLARATION

Investigators & Supervisor Declaration. By submitting this form the investigators & supervisor confirm the following:

- The information supplied above is to the best of the investigators' & supervisor's knowledge accurate.
- The investigators & supervisor have read the Minimal Ethical Risk Guiding Principles and clearly understand their obligations and the rights of participants, particularly as regards obtaining informed consent and data protection legislation.
- Student investigators have undertaken the appropriate ethics training.
- The proposal is viable and the student has appropriate skills to undertake the study.
- The participant selection and recruitment procedures, including the recruitment documents to be provided and the manner of obtaining informed consent, are appropriate and the ethical issues arising from the project have been considered (and agreed by the Supervisor if applicable).
- Investigators & supervisors understand that the study must not commence until confirmation of minimal risk registration has been received.

Section D - Minimal Ethical Risk Guiding Principles – for information

The principles set out below cover all studies involving human subjects at LJMU. It is the responsibility of supervisors to ensure that their students become familiar with LJMU research ethics policy and related guidance. All LJMU students and staff (in their capacity as investigators or supervisors) must comply with the LJMU Code of Practice for Research. The key principles can be summarised as follows:

1. The dignity, rights, safety and wellbeing of participants must be a primary consideration in any study. All participants must be warned in advance about any potential risks of harm. Harm to those involved in or affected by the study must be minimised. If you anticipate any potential harm to participants your study is not eligible for minimal risk registration and you should complete an ethics application form.
2. Central to the protection of participants is ensuring a transparent process of consent is in place. As part of this process, investigators are normally expected to provide potential participants with the following information:
 - Purpose of the study. The purpose of the study and comprehensive explanation of what their participation would involve (e.g. what is involved, when, how much time they will be expected to contribute, how often, with whom, where the study will take place etc.).
 - Potential risks (including physical, psychological, professional, reputational and legal risks) and how those will be mitigated.
 - Security of data, including personal details (e.g. encryption and password protected to ensure secure storage).
 - Will the data from participants be collected anonymously, or will it be anonymised by the investigator? (Anonymity means that the provider of the information cannot be identified, even by the person doing the study. This requires techniques such as using an anonymous questionnaire platform (Bristol online survey tool, etc.) or a web forum that employs pseudonyms. Data can also be anonymised after collection, by removing identifiers from the data.
 - Information on the intended audience of the study and how it will be presented to that audience (e.g. examined dissertation, peer reviewed article or book, conference paper).
 - How participants will be identified or referred to in the final report (i.e. fully identified, partially anonymous, directly attributable quotes etc.) (It must be made clear to participants if you intend to use direct quotes they have provided during the study, and their permission must be obtained. If specific comments are to be attributed to a person, the terms under which this will happen should be negotiated clearly in advance to avoid confusion).
 - Contact information for the investigator and/or supervisor.

As a general rule, investigators should provide all potential participants with an Information Sheet and Consent Form. Where traditional written consent is not obtained (e.g. signing a consent form), investigators must be able to demonstrate that informed consent has been obtained (e.g. by audio recording/ transcribing verbal consent etc.).

3. Investigators must respect the participant's right to withdraw themselves or their data from the study either during or after participation without having to provide a reason. Withdrawal of data from the study should be facilitated up until the point that is no longer practically possible.
4. All study data and personal data obtained from participants should be securely stored in line with the Data Protection Act (1998) and LJMU guidance
5. Ensuring that all participants understand that they are under no obligation to take part in a study. Participants should make their choice regarding participation freely, without any pressure from the investigator or any other individuals (e.g. gatekeepers).
6. Individual investigators must take personal responsibility for the conduct of their study. Investigators undertaking a study that involves human participation or personal data that requires ethical review must not begin their study until approval has been obtained. Investigators are also responsible for ensuring that any other approvals or permissions (e.g. gatekeeper approvals, DBS clearance) required to conduct the study are in place before the study

commences. If investigators are in any doubt as to the appropriate conduct of their study or its ethical implications they should discuss their concerns with their supervisor in the first instance (where appropriate) or members of the School, Faculty or University Research Ethics committees.

[BACK to email template](#)

SHOW US WHAT YOU THINK ABOUT YOUR COMMUNITY



We are looking for volunteers, **aged 30-64** to take part in a 'photovoice' study to investigate how people think their neighbourhood affects drinking behaviours

WHAT'S INVOLVED?

1

WORKSHOP
(1 hour)
Project overview
Visual literacy & photography ethics
Informal discussion

2

PHOTO TASK
(1 week)
Completed independently
Select and caption the most important photos for each prompt

3

INTERVIEW
(1 hour)
One-to-one interview to discuss the photos

4

EXHIBITION
(optional)
Confirming captions
Anticipated that a public photo exhibition will be held in 2023/24

You will be compensated with a **£50 LOVE2SHOP VOUCHER**

You are eligible to take part if you:

- Have considered cutting down your alcohol consumption in the past year (for any reason), have already reduced your alcohol consumption, and/or have actively engaged with alcohol treatment/recovery services in the last 12 months
- Live in Liverpool/Wirral and have lived there for at least 5 years
- Speak English fluently

To find out more, contact Jessie at: J.J.Smith@2020.ljmu.ac.uk or 07990430518

Appendix 7 – Participant Information Sheet – Version 1 (for current drinkers who have considered reducing their alcohol intake)



PARTICIPANT INFORMATION SHEET

Research Ethics Committee Reference Number: 22/PHI/017

Title of Study: *Using photovoice to explore neighbourhood influences on drinking behaviours*

You are being invited to take part in a research study. You do not have to take part if you do not want to. Please read this information, which will help you decide.

1. What is the purpose of the study?

The overall aim of this study is to explore how Liverpool residents who want to reduce their alcohol consumption perceive how their neighbourhood might influence their drinking behaviours. The study uses a research methodology called photovoice. This involves a photography task and interviews, in which people's beliefs about alcohol use and its relationship to the local area will be discussed.

The reason for conducting this study is that there are higher rates of alcohol consumption and related harms in the North West of England compared to other regions, and so we are interested in whether where people live affects this. It is important to hear from residents what challenges they have faced when trying to cut down on drinking and what changes they would like to see in their local areas to improve residents' health.

We hope to address the following objectives:

- To explore how aspects of local communities might help or hinder people trying to reduce their alcohol use
- To explore perceptions of how Liverpool neighbourhoods have changed over the last 10+ years, and how these changes have impacted drinking behaviours
- To investigate how the built and social environments could be improved to prevent harms resulting from alcohol use
- To share findings and photographs at a public exhibition involving residents, researchers and local stakeholders

This study is being conducted as part of the principal investigator's (Miss Jessica Smith) PhD in Public Health.

2. Why have I been invited to participate?

You have been invited because you have indicated that you meet the following inclusion criteria:

- You are aged 30-64
- You have considered cutting down on drinking or have recently reduced your alcohol consumption in the last 12 months
- You are not currently alcohol dependent or in treatment for alcohol problems
- You live in Liverpool or Wirral and have lived there for at least 5 years
- You are a fluent English-speaker

3. Do I have to take part?

No. You can ask questions about the research before deciding whether to take part. If you do not want to take part that is OK. We will ask you to sign a consent form and will give you a copy for you to keep. Submitting the questionnaire implies your consent to participate in this study. You can stop being part of the study at any time, without giving a reason, and we can destroy any data. You may withdraw from the study by contacting Miss Jessica Smith (J.J.Smith@2020.ljmu.ac.uk).

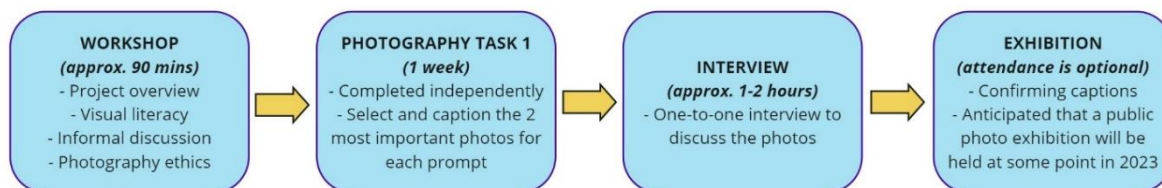
You must not take part in face-to-face interviews if you have COVID-19 or symptoms of COVID-19 - <https://www.nhs.uk/conditions/coronavirus-covid-19/symptoms/>

4. What will happen to me if I take part?

You will be asked to attend two sessions at the venue from which you were recruited (or another local venue) and take part in a photography task that can be completed in your own time. Following completion of the study, it is anticipated that the findings will be presented at a public exhibition held in the city centre to which you will be invited. The project details are outlined in the flowchart below this section.

The first session consists of an initial workshop lasting approximately 1 hour to 90 minutes. This session will introduce the project and you will receive basic training on ethical photography and visual literacy. There will then be informal discussions to explore your perceptions or concerns about your local area and how they relate to drinking behaviours. These will be used to inform the photography task. The photography task will involve taking photographs of features of your local area that you feel help and hinder cutting down on alcohol. This can be completed in your own time over a 1-week period. There will also be some online questionnaires about yourself to complete. A digital camera can be provided for the duration of the study if you do not own a personal device that can take photographs.

The second session will also take place at the community centre (or local venue) from which you were recruited. The photographs taken for the task will be used to facilitate a one-to-one interview about the neighbourhood environment and its effect on alcohol use. It is anticipated that this session will last approximately 1 hour, but the duration will depend on the amount of explanation you would like to share about the photographs' content. Alternatively, you will have the option to attend a virtual interview via Skype, Zoom or Microsoft Teams if you would prefer this.



We will ask your permission to take possession of the photographs – this will be confirmed on the consent form. Whilst in our possession we may use them in reports. Any cameras borrowed for the study will not be returned to you.

The questionnaire includes questions that will ask you about your mental health and alcohol use, which might be considered sensitive due to the personal nature of these questions. No one else apart from the researchers will see your answers.

5. Will I be photographed or video/audio recorded and how will the recorded media be used?

The photography task and audio-recorded interviews are essential to your participation but you should be comfortable with the interview process and photography task. You will be free to stop the audio recording (i.e. interview) at any time and therefore withdraw your participation.

With your consent, quotes from the audio recordings and photographs that you have taken for the task may be used in the final report and any further outputs. Your name will not be attributed to the photographs, audio recordings, or quotes from the interview. However, there is a chance that someone attending the exhibition may recognise something in your photo and link it to you. It is therefore important to take some time to think if there would be any implications for you if someone recognised you before you decide to consent to this.

The photographs, audio and/or video recordings of your activities made during this study will be used only for analysis. No other use will be made of them without your written permission. The audio recordings will be transcribed and anonymised, then the transcription will be used only for analysis. Quotes from the interview may be used as captions for your photographs at a public event where study findings are shared, but your name will not be attached to the quotes. The photographs will not feature you or anyone else since the focus of the study is on neighbourhood settings. The investigator will be unable to guarantee control of access to authorised viewing of the photographs taken because it is intended that they be included in the thesis, any publications, or other materials arising from this study.

6. Are there any potential risks in taking part?

Participating in the research is not anticipated to cause you any disadvantages or discomfort. However, you will be asked to recall situations (e.g. places, social settings) that you would typically drink in, so if you have previously experienced alcohol problems and feel that this could negatively impact your recovery, please do not take part. The potential physical and/or psychological harm or distress will be the same as any experienced in everyday life. If you would like further advice about alcohol use, then the NHS recommends that you speak to your GP. The NHS web pages also have some useful advice: <https://www.nhs.uk/live-well/alcohol-advice/alcohol-support/>

If you are considered a vulnerable individual or have concerns about the transmission of COVID-19, we can arrange a virtual interview via Skype, Zoom or Microsoft Teams should you still wish to participate in this study.

7. Are there any benefits in taking part?

There will be no personal benefit to you from taking part in this study, but it is hoped that collaboration in this research will stimulate critical thinking and greater awareness about how our environments shape our day-to-day behaviours, including our alcohol use.

8. Payments, reimbursements of expenses or any other benefit or incentive for taking part

You will receive a total of £50 in Love2Shop vouchers for your participation in this study. Unfortunately, we cannot reimburse any travel costs you may incur. Snacks will be provided at interviews.

9. What will happen to information/data provided?

The information you provide as part of the study is the **study data**. Any study data from which you can be identified (e.g. from identifiers such as your name, date of birth, audio recording etc.), is known as **personal data**. Your participation in this study will involve the collection/use of personal data. The study data collected/used will include more sensitive categories of personal data (special category personal data) such as your race; ethnicity; religion; trade union membership; and self-reported health.

We will keep personal data safe and secure. People who do not need to know who you are will not be able to access your name, contact details, questionnaire responses or audio recordings. The personal data collected will include:

- Contact details. With your agreement, we would like to store your contact details so that you may be contacted about the photograph exhibition event and future opportunities to participate in research studies.
- A record of consent (which will include your name)
- Study data. We will use a code/pseudonym so that you cannot be directly identified from the data. Study data will include audio recordings (which include your voice). Interview recordings will be deleted once the interview transcript has been verified as accurate. **After the interview recordings have been deleted, you will not be able to withdraw from the study because there will be no way to identify which transcript belongs to which participant.**

Study data will be kept for 5 years after the study has finished.

Once we have finished the study, we will keep the questionnaire data so we can check the results.

If you decide to take part in an online discussion using videoconferencing instead of a face-to-face session, then your participation in this research will be recorded in MS Teams and your personal data will be processed by Microsoft. This may mean that your personal data is transferred to a country outside of the European Economic Area, some of which have not yet been determined by the United Kingdom to have an adequate level of data protection. Appropriate legal mechanisms to ensure these transfers are compliant with the Data Protection Act 2018 and the UK General Data Protection Regulation are in place. The recordings will be

removed from the above third-party platform and stored on LJMU managed file storage as soon as possible following the completion of data collection.

Before your personal data is transferred to secure storage there is the possibility that the investigator could lose control of authorised access. We will take steps to mitigate the risk of your personal data being viewed by someone outside of the study team by storing recordings on a password-protected personal LJMU computer and only using secure servers to archive or transfer data. You should not participate if this risk is not acceptable to you.

We will write our reports in a way that no-one can work out that you took part in the study.

We would like your permission to use direct quotations (without including your name) in any research outputs.

The Investigator will keep confidential anything they learn or observe related to illegal activity unless related to the abuse of children or vulnerable adults, money laundering or acts of terrorism. The investigator has a professional obligation to inform relevant agencies if they learn about any involvement in any of those activities. In certain exceptional circumstances where you or others may be at significant risk of harm, the investigator may need to report this to an appropriate authority. This would usually be discussed with you first. Examples of those exceptional circumstances when confidential information may have to be disclosed are:

- The investigator believes you are at serious risk of harm, either from yourself or others
- The investigator suspects a child may be at risk of harm
- You pose a serious risk of harm to, or threaten or abuse others
- As a statutory requirement e.g. reporting certain infectious diseases
- Under a court order requiring the University to divulge information
- We are passed information relating to an act of terrorism

10. Who is organising/funding the study?

This study is organised by Liverpool John Moores University

11. Whom do I contact if I have a concern about the study or I wish to complain?

If you have a concern about any aspect of this study, please contact Jessica Smith or Prof Harry Sumnall, and we will do our best to answer your query. You should expect a reply within 10 working days. If you remain unhappy or wish to make a formal complaint, please contact the Chair of the Research Ethics Committee at Liverpool John Moores University who will seek to resolve the matter as soon as possible:

Chair, Liverpool John Moores University Research Ethics Committee; Email: FullReviewUREC@ljmu.ac.uk; Tel: 0151 231 2121; Research Innovation Services, Liverpool John Moores University, Exchange Station, Liverpool L2 2QP

12. Data Protection

Liverpool John Moores University is the data controller with respect to your personal data. Information about your rights with respect to your personal data is available from:

- <https://www.ljmu.ac.uk/legal/privacy-and-cookies/external-stakeholders-privacy-policy/research-participants-privacy-notice>
- by asking one of the study team or contacting us using the information below

13. Contact details

Principal Investigator: Jessica Smith (LJMU postgraduate research student)
LJMU Email address: J.J.Smith@2020.ljmu.ac.uk
LJMU School/faculty: Public Health Institute, Faculty of Health
Contact number: 07990430518

Supervisor Name: Professor Harry Sumnall
LJMU Email address: h.sumnall@ljmu.ac.uk

Appendix 8 – Participant Information Sheet – Version 2 (for participants recruited from recovery groups)



PARTICIPANT INFORMATION SHEET

Research Ethics Committee Reference Number: 22/PHI/017

Title of Study: *Using photovoice to explore neighbourhood influences on drinking behaviours*

You are being invited to take part in a research study. You do not have to take part if you do not want to. Please read this information, which will help you decide.

14. What is the purpose of the study?

The overall aim of this study is to explore how Liverpool residents who want to reduce their alcohol consumption (or have already reduced their consumption) perceive how their neighbourhood might influence their drinking behaviours. The study uses a research methodology called photovoice. This involves a photography task and interviews (one-to-one, and in a group), in which people's beliefs about alcohol use and its relationship to the local area will be discussed.

The reason for conducting this study is that there are higher rates of alcohol consumption and related harms in the North West of England compared to other regions, and so we are interested in whether where people live affects this. It is important to hear from residents what challenges they have faced when trying to cut down on drinking and what changes they would like to see in their local areas to improve residents' health.

We hope to address the following objectives:

- To explore how aspects of local communities might help or hinder people trying to reduce their alcohol use
- To explore perceptions of how Liverpool neighbourhoods have changed over the last 10+ years, and how these changes have impacted drinking behaviours
- To investigate how the built and social environments could be improved to prevent harms resulting from alcohol use
- To share findings and photographs at a public exhibition involving residents, researchers and local stakeholders

This study is being conducted as part of the principal investigator's (Miss Jessica Smith) PhD in Public Health.

15. Why have I been invited to participate?

You have been invited because you have indicated that you meet the following inclusion criteria:

- You are aged 30-64

- You have considered cutting down on drinking, have already reduced your alcohol consumption, or have actively engaged with services to maintain your recovery in the last 12 months
- You live in Liverpool or the Wirral and have lived there for at least 5 years
- You are a fluent English-speaker

16. Do I have to take part?

No. You can ask questions about the research before deciding whether to take part. If you do not want to take part that is OK. We will ask you to sign a consent form and will give you a copy for you to keep. Submitting the questionnaire implies your consent to participate in this study. You can stop being part of the study at any time, without giving a reason, and we can destroy any data. You may withdraw from the study by contacting Miss Jessica Smith (J.J.Smith@2020.ljmu.ac.uk).

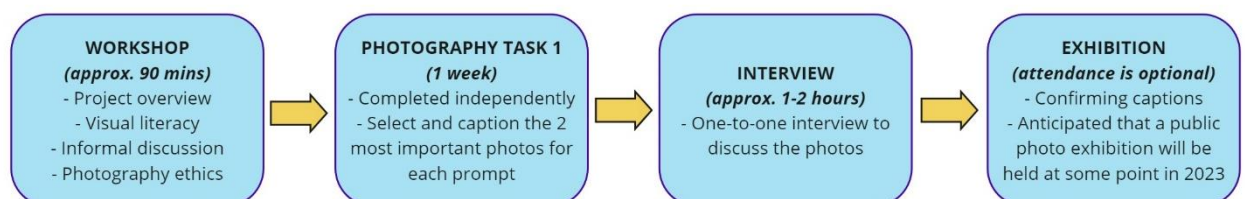
You must not take part in face-to-face interviews if you have COVID-19 or symptoms of COVID-19 - <https://www.nhs.uk/conditions/coronavirus-covid-19/symptoms/>

17. What will happen to me if I take part?

You will be asked to attend two sessions at a community centre (or local venue) and take part in a photography task that can be completed in your own time. Following completion of the study, it is anticipated that the findings will be presented at a public exhibition held in the city centre to which you will be invited. The project details are outlined in the flowchart below this section.

There will be some online questionnaires about yourself to complete before the first session, which consists of an initial workshop lasting approximately 1 hour to 90 minutes. This session will introduce the project and you will receive basic training on ethical photography and visual literacy. There will then be informal discussions to explore your perceptions or concerns about your local area and how they relate to drinking behaviours and abstinence. These will be used to inform the photography task. A digital camera can be provided for the duration of the study if you do not own a personal device that can take photographs. The photography task will involve taking photographs of features of your local area that you feel affect your (or others') drinking behaviours and/or recovery. This can be completed in your own time over a 1-week period.

The second session will also take place at the venue from which you were recruited (or another local venue). The photographs taken for the task will be used to facilitate a one-to-one interview with the principal investigator about the neighbourhood environment and its effect on alcohol use and recovery. It is anticipated that this session will last approximately 1 hour, but the duration will depend on the amount of explanation you would like to share about the photographs' content. Alternatively, you will have the option to attend a virtual interview via Skype, Zoom or Microsoft Teams if you would prefer this.



We will ask your permission to take possession of the photographs – this will be confirmed on the consent form. Whilst in our possession we may use them in reports. Any cameras borrowed for the study will not be returned to you.

The questionnaire includes questions that will ask you about your mental health and alcohol use, which might be considered sensitive due to the personal nature of these questions. No one else apart from the researchers will see your answers.

18. Will I be photographed or video/audio recorded and how will the recorded media be used?

The photography task and audio-recorded interviews are essential to your participation but you should be comfortable with the interview process and photography task. You will be free to stop the audio recording (i.e. interview) at any time and therefore withdraw your participation.

With your consent, quotes from the audio recordings and photographs that you have taken for the task may be used in the final report and any further outputs. Your name will not be attributed to the photographs, audio recordings, or quotes from the interview. However, there is a chance that someone attending the exhibition may recognise something in your photo and link it to you. It is therefore important to take some time to think if there would be any implications for you if someone recognised you before you decide to consent to this.

The photographs, audio and/or video recordings of your activities made during this study will be used only for analysis. No other use will be made of them without your written permission. The audio recordings will be transcribed and anonymised, then the transcription will be used only for analysis. Quotes from the interview may be used as captions for your photographs at a public event where study findings are shared, but your name will not be attached to the quotes. The photographs will not feature you or anyone else since the focus of the study is on neighbourhood settings. The investigator will be unable to guarantee control of access to authorised viewing of the photographs taken because it is intended that they be included in the thesis, any publications, or other materials arising from this study.

19. Are there any potential risks in taking part?

Participating in the research is not anticipated to cause you any disadvantages or discomfort. However, you will be asked to recall situations (e.g. places, social settings) that you would typically drink in (or would have drunk in), so if you have previously experienced alcohol problems and feel that this could negatively impact your recovery, please do not take part. You may want to seek advice from your recovery support group (e.g. The Brink) regarding participation in this study. The potential physical and/or psychological harm or distress will be the same as any experienced in everyday life. If you would like further advice about alcohol use, then the NHS recommends that you speak to your GP. The NHS web pages also have some useful advice: <https://www.nhs.uk/live-well/alcohol-advice/alcohol-support/>

If you are considered a vulnerable individual or have concerns about the transmission of COVID-19, we can arrange a virtual interview via Skype, Zoom or Microsoft Teams should you still wish to participate in this study.

20. Are there any benefits in taking part?

There will be no personal benefit to you from taking part in this study, but it is hoped that collaboration in this research will stimulate critical thinking and greater awareness about how our environments shape our day-to-day behaviours, including our alcohol use.

21. Payments, reimbursements of expenses or any other benefit or incentive for taking part

You will receive a total of £50 in Love2Shop vouchers for your participation in this study. Unfortunately, we cannot reimburse any travel costs you may incur. Snacks will be provided at interviews/focus groups.

22. What will happen to information/data provided?

The information you provide as part of the study is the **study data**. Any study data from which you can be identified (e.g. from identifiers such as your name, date of birth, audio recording etc.), is known as **personal data**. Your participation in this study will involve the collection/use of personal data. The study data collected/used will include more sensitive categories of personal data (special category personal data) such as your race; ethnicity; religion; trade union membership; and self-reported health.

We will keep personal data safe and secure. People who do not need to know who you are will not be able to access your name, contact details, questionnaire responses or audio recordings. The personal data collected will include:

- Contact details. With your agreement, we would like to store your contact details so that you may be contacted about the photograph exhibition event and future opportunities to participate in research studies.
- A record of consent (which will include your name)
- Study data. We will use a code/pseudonym so that you cannot be directly identified from the data. Study data will include audio recordings (which include your voice). Interview recordings will be deleted once the interview transcript has been verified as accurate. **After the interview recordings have been deleted, you will not be able to withdraw from the study because there will be no way to identify which transcript belongs to which participant.**

Study data will be kept for 5 years after the study has finished.

Once we have finished the study, we will keep the questionnaire data so we can check the results.

If you decide to take part in an online discussion using videoconferencing instead of a face-to-face session, then your participation in this research will be recorded in MS Teams and your personal data will be processed by Microsoft. This may mean that your personal data is transferred to a country outside of the European Economic Area, some of which have not yet been determined by the United Kingdom to have an adequate level of data protection. Appropriate legal mechanisms to ensure these transfers are compliant with the Data Protection Act 2018 and the UK General Data Protection Regulation are in place. The recordings will be removed from the above third-party platform and stored on LJMU managed file storage as soon as possible following the completion of data collection.

Before your personal data is transferred to secure storage there is the possibility that the investigator could lose control of authorised access. We will take steps to mitigate the risk of your personal data being viewed by someone outside of the study team by storing recordings on a

password-protected personal LJMU computer and only using secure servers to archive or transfer data. You should not participate if this risk is not acceptable to you.

We will not tell anyone that you have taken part in the focus group, although there is of course a possibility that another member of the group might recognise you. All members of the focus group will be asked to respect the confidentiality of their fellow participants.

We will write our reports in a way that no-one can work out that you took part in the study.

We would like your permission to use direct quotations (without including your name) in any research outputs.

The Investigator will keep confidential anything they learn or observe related to illegal activity unless related to the abuse of children or vulnerable adults, money laundering or acts of terrorism. The investigator has a professional obligation to inform relevant agencies if they learn about any involvement in any of those activities. In certain exceptional circumstances where you or others may be at significant risk of harm, the investigator may need to report this to an appropriate authority. This would usually be discussed with you first. Examples of those exceptional circumstances when confidential information may have to be disclosed are:

- The investigator believes you are at serious risk of harm, either from yourself or others
- The investigator suspects a child may be at risk of harm
- You pose a serious risk of harm to, or threaten or abuse others
- As a statutory requirement e.g. reporting certain infectious diseases
- Under a court order requiring the University to divulge information
- We are passed information relating to an act of terrorism

23. Who is organising/funding the study?

This study is organised by Liverpool John Moores University

24. Whom do I contact if I have a concern about the study or I wish to complain?

If you have a concern about any aspect of this study, please contact Jessica Smith or Prof Harry Sumnall, and we will do our best to answer your query. You should expect a reply within 10 working days. If you remain unhappy or wish to make a formal complaint, please contact the Chair of the Research Ethics Committee at Liverpool John Moores University who will seek to resolve the matter as soon as possible:

Chair, Liverpool John Moores University Research Ethics Committee; Email: FullReviewUREC@ljmu.ac.uk; Tel: 0151 231 2121; Research Innovation Services, Liverpool John Moores University, Exchange Station, Liverpool L2 2QP

25. Data Protection

Liverpool John Moores University is the data controller with respect to your personal data. Information about your rights with respect to your personal data is available from:

- <https://www.ljmu.ac.uk/legal/privacy-and-cookies/external-stakeholders-privacy-policy/research-participants-privacy-notice>
- by asking one of the study team or contacting us using the information below

26. Contact details

Principal Investigator: Jessica Smith (LJMU postgraduate research student)
LJMU Email address: J.J.Smith@2020.ljmu.ac.uk
LJMU School/faculty: Public Health Institute, Faculty of Health
Contact number: 07990430518

Supervisor Name: Professor Harry Sumnall
LJMU Email address: h.sumnall@ljmu.ac.uk

Appendix 9 – Participant Consent Form (used for both current drinkers and participants recruited from recovery groups)



PARTICIPANT CONSENT FORM

Study title: Using photovoice to explore neighbourhood influences on drinking behaviours

Research Ethics Committee Reference Number: 22/PHI/017

Principal Investigator: Miss Jessica Smith (LJMU postgraduate research student)

LJMU Email address: J.J.Smith@2020.ljmu.ac.uk

LJMU School/Faculty: Public Health Institute, Faculty of Health

Mobile: 07990430518

LJMU Central telephone number: 0151 231 2121

Supervisor Name: Professor Harry Sumnall

LJMU Email address: h.sumnall@ljmu.ac.uk

If you are happy to participate, please complete and sign the consent form below

		<i>Please initial</i>
1.	I confirm that I have read the information sheet dated May 2023 (version 1) for the above study, or it has been read to me. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
2.	I understand what taking part in the study involves	
3.	I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions I can withdraw from the study at any time, without giving a reason and without penalty or my legal rights being affected.	
4.	I have been advised about potential risks associated with taking part in this study and have taken these into consideration before consenting to participate	
5.	To the best of my knowledge, I do not meet any of the exclusion criteria outlined in the information sheet for this research. If this changes at a later date during study participation, I agree to notify the researchers immediately.	
6.	I agree to joint copyright of the photographs to Miss Jessica Smith. Photographs will not be used commercially.	
7.	I give permission for the investigator to take possession of the photographs and any camera lent to me for the duration of the photography task.	
8.	I agree that any digital cameras provided for the photography task will not be returned to me after the study has ended	

9.	I give permission to the investigator to take a copy of the photographs and to include them in the thesis/any publications, and to display them at a public exhibition following completion of the study		
10.	I understand that the investigator will be unable to guarantee control of access to authorised viewing of the audio recordings and photographs taken of me or taken by me during the study and I am happy to proceed.		
11.	I understand that the study involves taking audio recordings of me and I am happy to proceed. I understand that I will not be able to participate in the study if I later decide not to be audio recorded		
12.	I agree that audio recordings can be taken of me during the study. (Participants are free at any time to decline to be audio recorded whilst continuing to participate in the study)	YES	NO
13.	I understand who will have access to personal data provided, how the data will be stored and what will happen to the data at the end of the project.		
14.	I understand that personal data will remain confidential and that all efforts will be made to ensure I cannot be identified in reports or any further outputs		
15.	I understand that quotes from recordings taken of me or photographs taken by me may be used in the final report and any further outputs.		
16.	I understand that parts of our conversation will be used verbatim in future publications or presentations and that all efforts will be made to ensure I cannot be identified in reports or any further outputs		
17.	I understand that even though all efforts will be made to ensure I cannot be identified, I may be indirectly identifiable when the study findings are disseminated.		
18.	I understand the potential risks of being identifiable in reports and any future outputs when the findings of the study are disseminated		
19.	I understand that there may be instances where information is revealed which means that the investigators will be obliged to break confidentiality and this has been explained in more detail in the information sheet.		
20.	I agree to take part in this study		

Data Protection. Any personal information we collect and use to conduct this study will be processed in accordance with data protection law as explained in the Participant Information Sheet and the [Privacy Notice for Research Participants](#).

Name of Participant

Date

Signature

For participants unable to sign their name, mark the box instead of signing

I have witnessed the accurate reading of the consent form with the potential participant and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely

Name of Investigator

Date

Signature

Miss Jessica Smith

Name of Person taking consent

Date

Signature

(if different from investigator)

How does your
neighbourhood
influence the ways
you use alcohol?

A “PHOTOVOICE” STUDY



So, what are we doing..?

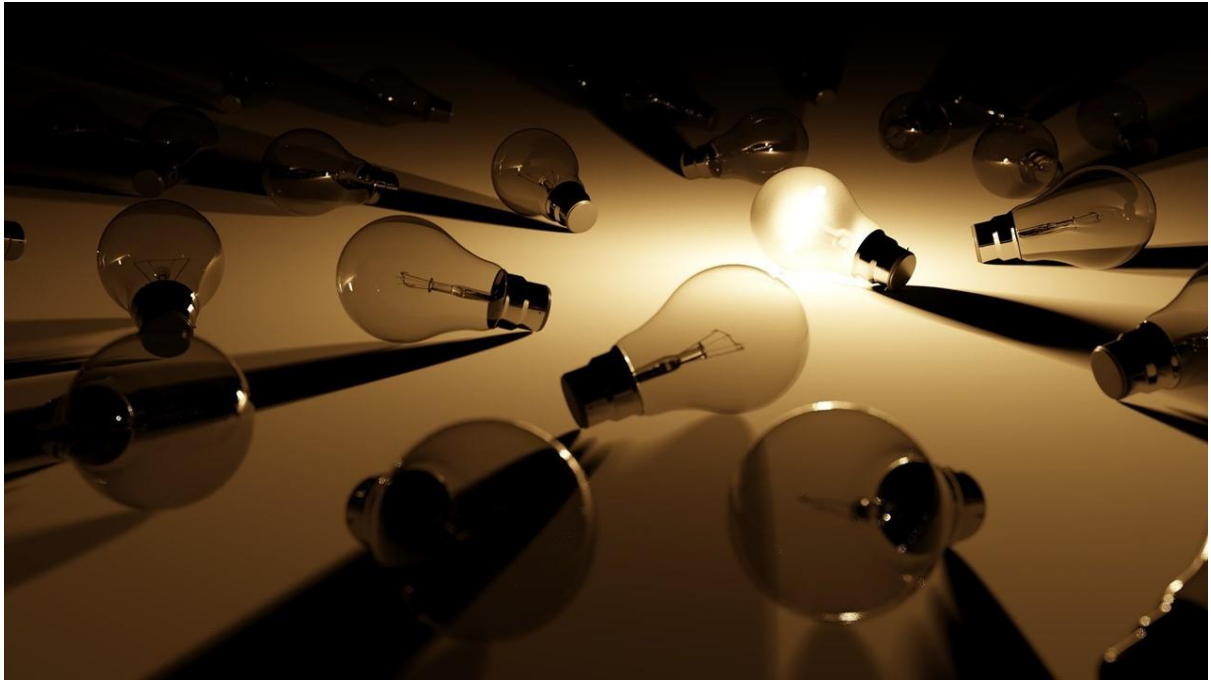
- *Photovoice*: exploring experiences using photography
- YOU are the experts – you live here and know the area
- Want to know what **helps** and **hinders** drinking reductions in your local environment
- And what **changes** you would want to happen in your area, if any





Visual literacy





Content & Composition

COLOUR

LIGHTING

SHADOWS

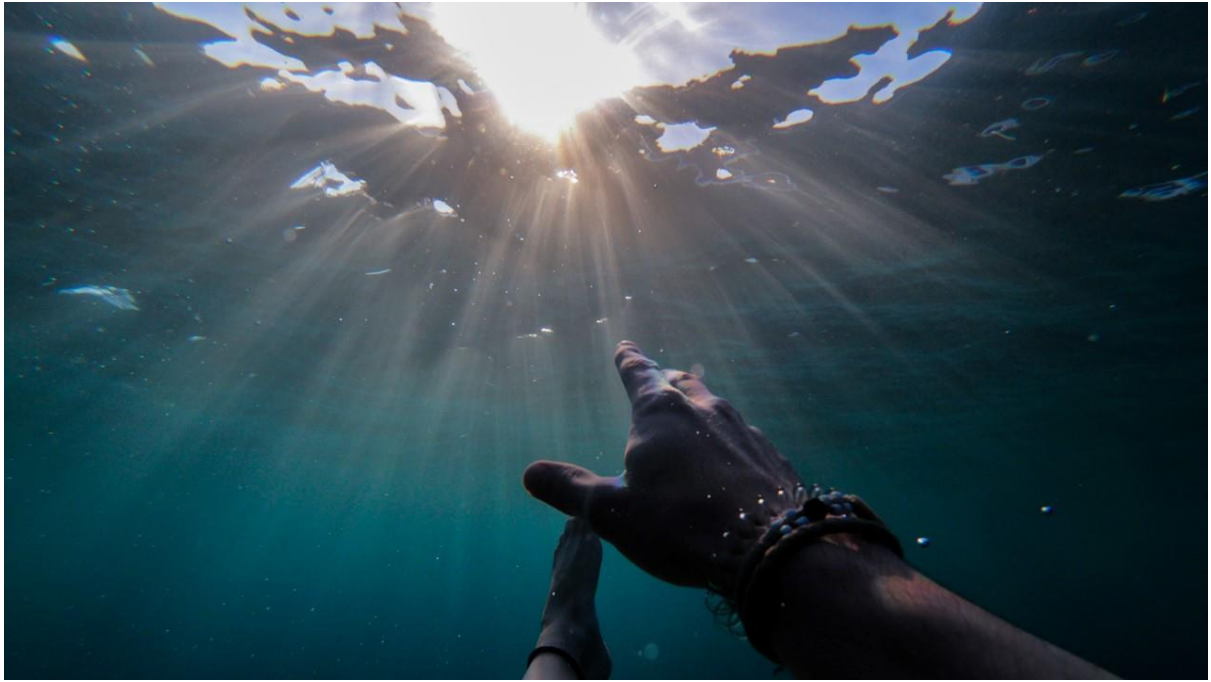
ANGLES

FOCUS

MOVEMENT / BLUR

STILLNESS

SCALE





Treasure hunt (20 mins)

Something **natural**

Something that represents **you**

“Community”

A **detail** you think no one else will have noticed

ETHICAL PHOTOGRAPHY

Please **DO NOT** take photos that...

- Include people's **faces** (including your own)

You might want to take photos that depict social drinking situations. In this case, you may include features such as hands/silhouettes BUT please be mindful that this increases the risk of identifying the person – especially if it shows e.g. tattoos, customised clothing, logo on uniform, names, license plates



- Show **illegal activity** taking place
- Involve putting yourself or others **at risk** – do not do anything you wouldn't normally do

Tips!

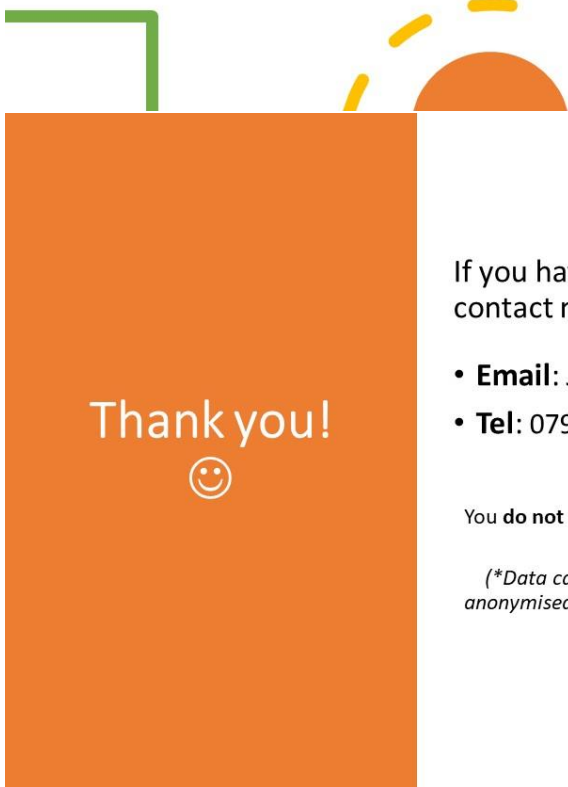


- Make sure your **camera lens is clean** and your **finger is not covering it**
- Take photos with the **light behind you** for clearer images
- Using **flash** can be helpful if your subject is poorly lit or if there are some unwanted shadows
- Try taking photos from **different angles**
- Be **creative** (if you like!)



How does your
neighbourhood
influence the
ways you use
alcohol?

- What features of your neighbourhood make cutting down on alcohol easier?
- What features of your neighbourhood make cutting down on alcohol harder?
- How has Liverpool changed over the last 10 years? How do you think these changes have affected people's alcohol use?



Thank you!



If you have any concerns or questions, please contact me at:

- **Email:** J.J.Smith@2020.ljmu.ac.uk
- **Tel:** 07990430518

You **do not** have to take part in this study and can stop participating at any point*

*(*Data cannot be withdrawn once interview transcripts have been anonymised as we will not be able to match you to your data after this point)*



Project summary

- **Why are we doing the study?**
 - To understand what features of local areas promote and prevent alcohol use
 - To see what changes you would want to happen in your neighbourhood to tackle harms related to alcohol
- **Aim:**
 - To explore perceptions of how neighbourhood environments influence alcohol use using “photovoice”
- **Photovoice:**
 - Exploring experiences with photography
- **What you’ll do next:**
 - Take as many photographs as you like that show how you think your neighbourhood affects alcohol use
 - Choose the 2-3 most important photographs for each prompt and caption them
 - Attend an interview to discuss the photographs
 - £50 in vouchers to be given after attending the sessions
 - Exhibition to be arranged to showcase the photographs and findings

Task summary

- Take photos on your phone/camera that show how you feel your neighbourhood affects alcohol use. Use these questions as a guide:
 - **What features of your neighbourhood make cutting down on alcohol easier?**
 - **What features of your neighbourhood make cutting down on alcohol harder?**
 - **How has Liverpool changed over the last 10 years? How do you think these changes have affected people’s alcohol use?**
- Photos must be...
 - Able to be accessed digitally e.g. via email, SD card
 - In accordance with **ethical** guidelines (no photos of faces or illegal activity, and do not put yourself or others in danger to capture a photo)
- To be completed in your own time over approximately **1 week**
 - Take as many photos as you like
 - Pick the **top 2-3** most important photos for each prompt – caption them & they will be discussed at interview

Appendix 11 – Reflexive notes for Study 3

Reflexive note: *Challenges associated with recruiting participants for Study 3 and rationale for using photo-elicitation interviews instead of photovoice*

It was initially planned that participants recruited from community centres would attend both a focus group and an individual interview, as part of a “photovoice study”, to discuss the photos taken for the participatory photography tasks. However, after discussions with my Director of Studies, it was decided that all participants would attend only one interview as part of a photo-elicitation interview (PEI) study. This decision was made primarily due to very low interest in the study. Furthermore, for some community centres, there was interest from only one or two individuals, which was insufficient to conduct focus groups. It was not considered appropriate to merge these individuals from different venues, but it was also thought that they should not be excluded from the research because of low engagement from others. Conversations with community centre staff and attendees, and inferences made from these conversations, led to the following assumptions about potential reasons for non-participation:

- **Role of participatory photography (attitudinal barrier).** Some individuals did not think of themselves as creative and so were hesitant to take part due to the photography aspect. These individuals were reassured that no experience in photography or creative arts was necessary, and that basic training would be provided. However, this remained a barrier to participation.
- **Stigma towards alcohol-related issues and behaviours (attitudinal barrier).** There was sometimes resistance to taking part in the study as some people would assume that the research focus was on issues like alcohol dependence and would immediately decline because they were “*not an alcoholic*”. Issues regarding stigma also extended to discussions with some community centre staff, who suggested that their venue was not an appropriate place to recruit from because they did not have people with alcohol problems attend their activities or have specific groups for people in recovery. Staff often suggested that I make contact with recovery groups such as Alcoholics Anonymous, Narcotics Anonymous or smoking cessation clinics. These perceptions sometimes persisted despite clarification regarding the target group for the research. In response to this, the approach to recruitment evolved to instead introduce the project as a community study about health behaviours at first, rather than explicitly stating that the aim was to examine how neighbourhood environments

influence alcohol use. I considered whether this would be misrepresenting the study or misleading potential participants but decided that this was the optimal approach as the focus on drinking was made clear prior to individuals agreeing to be contacted. Both the workshop and participant information sheet also gave an in-depth account of the rationale for the study, research objectives, and what was involved. Given that stigma was deemed a barrier to study engagement, PEI was preferred over photovoice because it did not involve participants disclosing potential alcohol problems to other members of their community centre. This is important because community centres may be important spaces for individuals to gain social support and enrichment, so self-disclosure of sensitive information relating to their alcohol use could negatively impact their engagement and experience with the centres.

- **Extent of commitment to the study (practical barrier).** Some individuals were concerned that the study was too long and/or complicated, which meant that they were unsure whether they could complete all the stages. Compared to other types of research, such as self-report questionnaires or one-off interviews, this study required a much greater amount of time, energy, and commitment – both before and after the study amendments were made. This may have been a more salient barrier to participation for individuals in full-time employment, who have dependents, and/or who are economically disadvantaged (e.g. affording travel expenses, not owning a smartphone). It is also possible that the incentive (i.e., £50 in Love2Shop vouchers) was perceived as insufficient to compensate for the extent of commitment required to complete all stages of the study. Alternatively, the multistage design may have been confusing, particularly for those who have not been involved in research before, and this may have discouraged participation.
- **Classes and activities at community centres do not always involve the same individuals each time (practical barrier).** There was a preconception from myself and my supervisory team that recruiting from community centres would be effective since there was likely to be sessions held for regular groups, which would make convening with participants at multiple timepoints easier. However, I was frequently told that attendees at the classes and activities would change from session to session, so the anticipated benefit (to participants) of having a familiar, local place to meet with other class members was undermined. This made conducting a PEI study challenging but it is likely that these issues would have conferred additional difficulties for a photovoice study, which would require multiple participants to meet at the venue at a particular time.

- **Other logistical issues.** For example, attendees arriving late to the scheduled activity, staff asking if I would get involved with the activity prior to advertising/recruiting for the study, and small rooms in which it is not possible to subtly ask people about whether they fit the eligibility criteria.
- **Level of alcohol use and consideration of reducing use (eligibility criteria).** Many individuals were non-drinkers or very occasional drinkers. Others were current drinkers but had not considered (and still had no intention of) reducing their alcohol consumption.

Reflexive note: *How do participants perceive me?*

- I felt like there was some distrust towards myself – or academics in general – from some participants from community centres. For example, one participant made a comment speculating if I was affiliated with the police as he insinuated using illicit drugs during drinking sessions in on-trade venues. The comment was light-hearted and I reassured him that I was not affiliated with the police, did not directly question him about his drug use, and explained that anything he wished to share about drug use would be anonymous. I tried to achieve a conversational style that facilitated rapport-building but was also professional and focused on the research topic. Despite this, it is possible that some participants may not have felt comfortable or safe sharing details of personal experiences relating to alcohol consumption, which may have resulted in more surface-level data rather than more nuanced understandings. In contrast, it seemed that participants recruited from recovery groups were more trusting and much more open about their alcohol-related experiences.
- Some participants made references to “foreigners” or “immigrants” who were perceived to be “taking benefits”, which in turn was thought to be a reason for some neighbourhood problems. As a non-White researcher interviewing a sample of entirely White participants, I considered whether this may have hindered open communication about neighbourhood problems and the causes of them – and may have led me to avoid probing further into these views. However, all participants were respectful, friendly, and happy to share their experiences of neighbourhood interactions and drinking practices. Perhaps my SES (most saliently, being a postgraduate student) and English accent protected against any issues in these circumstances.
- I felt like I generally had good rapport with the participants, which was beneficial for obtaining ‘insider knowledge’ about the experiences of some people who attend

recovery groups, which I have no experience of. Some participants used stigmatising and pejorative language like “alcy”, “alcoholic” and “addict” in reference to themselves and other people in recovery. I did not use these terms but also did not discourage their choice of language.