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Supporting alcohol change in mid-life women: focus group insights informing refinement of the SPACES intervention logic model

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ABSTRACT

Objectives: Logic model refinement is an underreported stage of complex intervention development. SPACES (Storytelling Promoting Alcohol Choice, Empowerment and Sharing) combines narratives with Behaviour Change Techniques (BCTs) to support alcohol reduction among mid-life women. This study aimed to refine the logic model.

Methods: Eight online focus groups were conducted with 20 mid-life women and 12 other stakeholders. Theory-informed reflexive thematic analysis used the Capability, Opportunity, Motivation–Behaviour (COM-B) framework to examine drinking influences and inequalities. A public advisory group informed study materials and interpretation of findings.

Results: Five themes described inequality-related influences on drinking and engagement with support: (1) structural inequalities shaped physical opportunity; (2) gendered norms shaped social opportunity; (3) emotional load shaped automatic motivation; (4) cognitive bandwidth shaped psychological capability; and (5) identity and stigma shaped reflective motivation. Environmental restructuring, emotional/social support and alcohol-free activities were supported. Information, alcohol-free and low-alcohol product substitution and goal-setting were acceptable for some but required adaptation to avoid exacerbating inequalities. Findings informed refinements to COM-B determinants, BCTs, delivery through stories and toolkits, and hypothesised mechanisms of action.

Conclusion: This study provides a worked example of inequality-sensitive logic model refinement and a strong foundation for SPACES prototyping and feasibility testing.

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KEYWORDS

Mid-life women; alcohol reduction; COM-B; logic model; inequalities; storytelling

Introduction

Alcohol use remains a major public health concern in the UK and internationally (GBD 2020 Alcohol Collaborators, 2022). Recent UK data indicates that mid-life women drink more frequently than younger women and that one in five drink at increasing- or

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higher-risk levels (Dare et al., 2020; NHS Digital, 2024, 2026). Although consuming ≤ 14 units per week is often framed as 'low risk', women experience alcohol-related harms at lower thresholds than men, including increased risk of breast cancer (Bagnardi et al., 2015) and faster progression to alcohol-related liver disease (Erol & Karpyak, 2015). These biological and sociocultural disparities underline the urgent need for interventions tailored specifically to women in mid-life.

Mid-life (typically 40–65 years) is marked by intersecting challenges including menopause transition, intensive caring responsibilities, work strain and financial pressures (Caluzzi et al., 2022; Davies et al., 2025). Qualitative research consistently shows that alcohol plays multiple roles in women's lives during this period, including promoting social connection, reinforcing identity, and offering emotional relief or 'time out' from responsibilities (Emslie et al., 2015; Jackson et al., 2018; Lyons et al., 2014). At the same time, mid-life women report strong social and cultural expectations to drink, alongside stigma and shame around help-seeking or expressing concerns about their drinking (Haighton et al., 2016; Lamb & Kougiali, 2025). These factors highlight the need for approaches that address the broader social and structural contexts in which drinking occurs.

Despite this, mid-life women remain underrepresented in alcohol-reduction research and underserved by existing interventions (Kersey et al., 2022; Miller et al., 2023). Many available tools rely heavily on information provision or self-monitoring, even though evidence suggests these strategies have limited impact when drinking is shaped by habit, emotional coping, and social pressures (Davies et al., 2024; Marteau, 2016). In earlier work, focus groups and a Delphi study with over 300 mid-life women identified substitution, goals and planning, identity work and storytelling as promising and acceptable behaviour change techniques (BCTs) for this group (Davies et al., 2026; Davies et al., 2024).

One substitution strategy requiring particular attention was the use of alcohol-free and low-alcohol (NoLo) products. In the UK, 'alcohol-free' products contain no more than 0.05% alcohol by volume (ABV), while 'low-alcohol' products contain no more than 1.2% ABV. If NoLo products are used in place of regular strength products they have potential to reduce harms (Perman-Howe et al., 2024). Due to this potential, expansion of the NoLo market constitutes a pillar of the UK Government's 10 Year Health Plan for England (UK Government, 2025), although evidence of substantial benefits remains somewhat mixed (Davies et al., 2025; Nicholls, 2023). In our previous work with mid-life women, NoLo products were viewed as potentially helpful for reducing alcohol consumption, but also raised inequality related concerns about cost, accessibility, and whether they would be useful for women drinking to cope or for intoxication-related reasons (Davies et al., 2026).

Our research also suggested that storytelling, in particular, appeared to offer a non-judgemental, relatable and emotionally engaging means of supporting behaviour change. Storytelling may be effective because narratives increase identification, reduce defensiveness and support perspective-taking (Perrier & Martin Ginis, 2018; Sinclair et al., 2017). However, the mechanisms by which storytelling interacts with specific BCTs and the extent to which these techniques reflect mid-life women's actual needs remain under-specified.

These insights informed the development of a logic model for SPACES (Storytelling Promoting Alcohol Choice, Empowerment and Sharing), a novel intervention integrating story-based content with evidence-based BCTs. The primary goal of SPACES is to support mid-life women who are drinking at increasing or higher-risk levels, or who are concerned about their drinking, to reduce alcohol consumption to 14 units or fewer per week in ways that feel acceptable, realistic and self-directed.

Logic models are commonly used in complex intervention development to make explicit how an intervention is expected to work, by linking the problem being addressed, proposed intervention components, hypothesised mechanisms of action, and intended outcomes (Moore et al., 2015). A clear logic model is particularly important before prototyping or feasibility testing because it helps ensure that intervention content is theoretically coherent, responsive to context, and focused on plausible pathways of change (Skivington et al., 2021).

The initial SPACES logic model (see Table 1) was developed using the Behaviour Change Wheel (BCW) and its Capability, Opportunity, Motivation–Behaviour (COM-B) behavioural diagnosis (Michie et al., 2014) to identify key determinants of drinking and appropriate intervention functions, using our primary data and existing literature (Davies et al., 2026). Because many of the influences on women's drinking are deeply contextual and unevenly experienced, before prototyping and testing the intervention, we felt that additional qualitative inquiry with women and stakeholders was

Table 1. Initial version of the SPACES intervention logic model.

BCT group	Specific BCT	Hypothesised mechanism of action	Short term impact/mediators.
Increase awareness of consequences	Inform about negative health consequences	Belief about severity of an outcome Belief about health consequences of behaviour	Increased awareness about alcohol harms.
Guide how to perform behaviour	Suggest how to perform behaviour	Behavioural capability Self-efficacy	Increased feelings of confidence
Advise specific behaviour	Substitute behaviour	Belief about need satisfaction Situational self-efficacy belief	Increased likelihood of substitution
Restructure the environment	Add objects to the directly experienced environment	Mental plan for a behaviour Behavioural intention	Changed purchasing habits
Social support	Arrange emotional support Advise to seek emotional support	Social behavioural capability Need for sense of belonging	Increased feeling of being supported and connected
Prompt focus on self-identity	Adopt changed self-identity	Personal value	Personal identification as a person who consumes < 14 units of alcohol
Goal directed	-Set behaviour goal -Action planning -Make a goal public	A self-regulation capability to modulate one's behaviour.	Increased self-regulation, Increased confidence
Monitoring	Self-monitor behaviour	Awareness	Increased knowledge of habits
Advise how to change emotions	Advise sensory/behavioural/cognitive ways to increase positive emotions.	Emotional self-regulation capability	Increased self-regulation Alternative coping strategies

Note: This model was developed from formative research (Davies et al., 2024, 2025).

essential to assess whether the initial SPACES logic model reflected lived experience and to identify gaps in its mechanisms and assumptions. The Medical Research Council (MRC) Framework for developing and evaluating complex interventions, and other guidance emphasises the importance of iterative development, explicit programme theory, attention to context and diverse stakeholder perspectives prior to feasibility testing (Hawkins et al., 2017; Skivington et al., 2021). Logic model refinement is therefore a critical, yet often underreported, stage of intervention development. However, current guidance provides limited detail on how logic model refinement should be operationalised or reported in practice. Presenting the refinement of the SPACES logic model as a standalone study enables greater transparency in how theory, evidence and lived experience were integrated to strengthen the foundations of SPACES and may offer a worked example for other researchers seeking to document this stage of development. In this study, we used qualitative focus groups with mid-life women and stakeholders to examine how well the initial SPACES logic model aligned with lived experience and to refine its components, mechanisms and delivery pathways accordingly. This study was guided by four research questions (RQs):

RQ1: To what extent does the SPACES logic model capture the key influences on mid-life women's drinking?

RQ2: How are the key influences identified in the SPACES logic model shaped by inequalities, and how might these inequalities affect engagement with alcohol-reduction support?

RQ3: What is the evidence for, or against, the Behaviour Change Techniques (BCTs) in the SPACES logic model, including the use of NoLo products as a substitution strategy?

RQ4: How should the SPACES logic model be refined to incorporate these new insights gained from this study and address inequalities, and strengthen its hypothesised mechanisms of action?

Method

The work reported here is part of a larger study, with three further phases, which involved developing intervention materials and assessing the acceptability of the intervention. The study protocol and survey materials are available on the Open Science Framework (Davies et al., 2024). Procedures were reviewed by Oxford Brookes University Research Ethics Committee (ref 241837). All participants provided informed consent.

Public involvement and steering committee

An important part of the study was the inclusion of a public advisory group (PAG). Our PAG comprised seven women aged 40–65 with lived/living experience of drinking alcohol at levels that they felt had caused them harm, and those with experience of reducing their drinking. The study was also guided by a steering committee comprising one alcohol charity representative, one women's health charity representative, one

lived experience coordinator from a local treatment service provider and one academic researcher with expertise in behaviour change.

Design: focus groups

We used a qualitative theory informed focus group study design. Focus groups were used to bring participants together to discuss and reflect on aspects of the initial logic model because they are a useful means of identifying areas of agreement and disagreement on a shared topic (Kitzinger, 1995). Online groups meant that participants could be drawn from a range of geographical locations, and evidence suggests that online groups focus groups can generate similarly rich data to that generated face to face (Flynn et al., 2018).

Participants

In total, we held five focus groups with 20 mid-life women aged 40–65 and three focus groups with 12 stakeholders. Participant characteristics are shown in Table 2. Further demographic breakdowns are not reported for stakeholder participants because of the small and potentially identifiable nature of this group.

Across the three stakeholder focus groups, participants represented a wide range of organisations involved in alcohol use, recovery, and support. They included researchers, alcohol treatment service providers, and lived-experience practitioners working within alcohol charities, social enterprises, local government, and non-profit organisations. Their work spanned supporting people with a range of goals, from moderation to sobriety and recovery, and covered diverse populations, including mid-life women, people with multiple disadvantages, adults with mental health conditions, those experiencing homelessness or unemployment, and LGBTQ+ groups. Participants were based across the UK, with one also working internationally, bringing perspectives from urban and rural contexts, and from communities varying in socioeconomic status and ethnic diversity.

In the five focus groups with 20 mid-life women aged 40–65 ($M = 50.24$, $SD = 4.71$), most identified as White (65%), with additional representation from Asian or Asian British (20%) and Black or Black British (5%) backgrounds; 10% preferred not to state their ethnicity. The majority described themselves as straight or heterosexual (70%), with others identifying as gay or lesbian (5%) or asexual (4%), and 20% preferring not to say. Educational backgrounds varied, with most participants holding a bachelor's degree (25%) or postgraduate qualification (45%). Just under half were former drinkers (45%), and 55% were current drinkers.

Recruitment across all groups was purposive to maximise diversity of perspectives. To support this, we engaged with Healthwatch organisations in areas of deprivation, online support communities, used our existing networks, and local and national alcohol treatment services. Group D comprised women who had taken part in a previous study, while Group E included women purposively recruited from an area of high deprivation. The remaining groups were recruited through a range of sources. Group members did not know each other in advance.

Table 2. Participant characteristics.

Group		
Stakeholders <i>N</i> = 12		
Groups A-C		
Organisation		
Social enterprise/network	3	25%
Charity/non profit	3	25%
Higher education	3	25%
Local government	2	17%
Self-employed	1	8%
Women aged 40–65	Mean	SD
<i>N</i> = 20		
Groups D-H		
Age	50.24	4.71
Ethnicity	N	%
White	13	65%
Asian or Asian British	4	20%
Black or Black British	1	5%
Prefer not to say	2	10%
Sexuality		
Straight/heterosexual	14	70%
Gay or lesbian	1	5%
Asexual	1	5%
Prefer not to say	4	20%
Education		
Secondary school GCSEs	1	5%
Secondary school A-Levels	2	10%
Bachelor's degree	5	25%
Postgraduate degree	9	45%
Prefer not to say	3	15%
Alcohol		
Former-drinker	9	45%
Current drinker	11	55%

Procedure

Focus groups were held online *via* Zoom in November and December 2024 and followed a semi-structured topic guide. Sessions lasted approximately one hour, were recorded, anonymised and transcribed verbatim prior to analysis. Participants received a debrief and £30 shopping voucher to thank them for taking part. In each session, we gave a presentation to prompt discussion on topics (see [supporting materials](#)) covering:

1. Key influences on drinking in mid-life, mapped from the initial logic model (see [Table 2](#) and grouped by COM-B components.
2. Proposed BCTs presented as narratives (e.g. self-monitoring was presented as 'Bridget' saying '*I found it helpful to keep a note of what I was drinking each day*')
3. Views on inequalities and access, focusing on how structural, social, identity-related, and cognitive mechanisms influence women's drinking and their capacity to engage with an intervention.
4. Perspectives on NoLo products, shown via a presentation and discussed as part of the 'Substitute behaviour' BCT. Prompts invited participants to consider whether NoLo products acted as enablers (e.g. facilitating social inclusion) or barriers (e.g. maintaining alcohol-related cues), and whether their availability or cost might reinforce inequalities.

Analysis

Analysis for RQ 1 and 2 followed the structure of Reflexive Thematic Analysis (Braun & Clarke, 2022) and used COM-B as an initial theory-informed organising framework. Transcripts were first coded to COM-B domains to examine how women's drinking was shaped by capability, opportunity and motivation. Within each COM-B domain, we then developed a more data-led interpretation of inequality-related mechanisms, such as health-literacy disparities, gendered social norms, constrained physical environments and trauma-linked coping strategies. This approach aligns with the MRC Framework, which emphasises examining how interventions interact with context, including social and structural conditions that shape behaviour and engagement (Skivington et al., 2021). In line with the MRC guidance to consider variation in needs, resources and feasibility across diverse groups, our analysis explored how different mid-life women might experience unequal capability, opportunity or motivation to reduce their drinking, and how these inequalities could affect the likely acceptability or feasibility of different BCTs.

To address RQ3, we appraised each BCT in the initial SPACES logic model using focus group evidence relating to acceptability, perceived usefulness, feasibility and potential inequality-related consequences. The appraisal drew on participants' direct responses to the BCT examples, their wider accounts of drinking contexts, and stakeholder reflections on implementation and access. BCTs were categorised as strongly supported, mixed or conditionally supported, or requiring careful adaptation. NoLo product substitution was considered separately because previous research had identified mixed views about its usefulness and potential inequality-related consequences (Davies et al., 2024).

Finally, this analysis informed development of a revised logic model, refined iteratively with feedback from the Steering Group and Public Advisory Group.

Reflexivity

The research team brought expertise in alcohol research, behaviour change, women's health and qualitative methods, alongside public involvement from women with lived experience. These perspectives shaped the development of the topic guide, interpretation of findings and refinement of the SPACES logic model. Interpretations were discussed across the research team and considered alongside feedback from the public advisory group and study steering group, enabling alternative perspectives to inform the analysis and refinement of the SPACES logic model.

Results

RQ1: Key influences and RQ2: Inequalities

The original SPACES logic model captured several core determinants of mid-life women's drinking; however, the COM-B mapping (see summary in Table 3; full tables for each COM-B component in Supplementary File 1) revealed important additional inequality influences across all domains that were not fully represented in the earlier model. Five themes were identified and mapped to COM-B domains: physical

Table 3. Summary of key influences on mid-life women's drinking mapped to COM-B domains and related inequality themes.

COM-B Domain	Related inequality theme	Key Influences Identified	Exemplar Quotes
Psychological Capability: knowledge, skills, understanding	Psychological capability and cognitive inequalities	• Patchy knowledge of alcohol harms and units • Harms "not on my radar" despite guidelines • Menopause as a learning mechanism (women notice alcohol worsening symptoms) • Capability develops through lived experience (sleep changes, anxiety, energy crashes).	<i>"There is... even lack of willingness sometimes to acknowledge harms... I would say there is like really, really basic ignorance... 'my grandad drank and lived, what's the problem?'" – B7</i> <i>"It's not just gaining knowledge, it's experiencing it... feeling the anxiety after, plus periods of abstinence and going out without drinking gave me confidence."</i> – D13
Physical Opportunity: availability, environment, access	Physical opportunity and structural inequalities	• 24/7 availability (delivery apps, shops) • Marketing and supermarket placement trigger drinking • Home supply strongly shapes behaviour • Structural inequalities (poverty, housing, childcare) limit alternatives and increase reliance on alcohol.	<i>"The alcohol industry has invested massively in alcohol-free alternatives not to get people off alcohol, but to keep people drinking in a different way." – A2</i> <i>"If it's not in the house, I won't drink it... if it's there, I will." – F21</i>
Social Opportunity: norms, pressures, relationships, culture	Social opportunity, norms and gendered expectations	• Drinking as social norm ("only drug you explain not using") • "Mummy-wine" culture, boozy playdates • Partner/friend influence strong (enabling or hindering) • Cultural expectations (e.g. South Asian, Irish heritage) • Social exclusion after reducing drinking • NoLo products used for social inclusion	<i>"People worry about how they'll fit in when they go down the pub or to dinner parties... it can feel very lonely initially; alternatives need to be embedded early." – C11</i> <i>"It... links into the reward... and the mummy club, if you're not working and have a bad day being a mum, you're sort of allowed to be in that club of having a drink." – H31</i>
Reflective Motivation: beliefs, intentions, identity, evaluations	Reflective motivation: identity and stigma	• Menopause a major reflective turning point • Identity shifts (e.g. "conscious drinker") • Online information (e.g. Instagram) prompts reassessment • Self-rules fragile (limits quickly dissolve socially).	<i>"Menopause symptoms can also be the reason some women reduce their drinking, because they see alcohol is having a negative impact" – A3</i> <i>"I wouldn't consider myself a non-drinker, but... a more conscious drinker... reframing my relationship with alcohol helps me reduce." – D15</i>

(Continued)

Table 3. Continued.

COM-B Domain	Related inequality theme	Key Influences Identified	Exemplar Quotes
Automatic Motivation	Automatic motivation and emotional inequalities	• Stress, overwhelm, emotional regulation central • Trauma-linked or anxiety-relief drinking • Strong habitual cues (sofa, cooking, Friday rituals) • Need to change physical routines to break habits • Complex role of NoLo products (cue-maintaining vs. helpful substitute)	“The habitual drinking doesn’t quite capture it—drinking to help sleep, to numb... and also how we’re taught to drink—‘this is what we do in our family.’” - A4 “I just did it because that’s what we did... that’s what I’d always done.” - F23

Note: A-C are stakeholders and D-H are mid-life women (More detailed COM-B evidence tables, which supported the analysis, are available in [Supplementary File 1](#)).

opportunity and structural inequalities; social opportunity, norms and gendered expectations; automatic motivation and emotional inequalities; psychological capability and cognitive inequalities; and reflective motivation, identity and stigma. [Table 3](#) summarises how these themes sit within COM-B and shows the key influences identified in the focus groups. The themes are therefore presented as an inequality-focused interpretation of how capability, opportunity and motivation were shaped in women’s accounts. Below, the themes are discussed with supporting data and implications for the SPACES logic model. Participant quotes from the data labelled A-C are stakeholders (S), while D-H are mid-life women (W).

Theme 1: Physical opportunity and structural inequalities

Participants across all groups described a contemporary environment in which alcohol is cheap, omnipresent, digitally accessible, and woven into everyday life. This ubiquitous availability shaped drinking by convenience and by removing friction, reducing opportunities for pause or self-regulation, and amplifying temptation. As one woman explained:

When I was in my 20s the pub was only open at certain times... now you can get anything delivered at virtually any time of day. W D16

However, participants also emphasised that physical opportunity was influenced by unequal access to alternatives, as well as the availability of alcohol. Women facing housing precarity, financial strain, unsafe relationships or limited access to affordable leisure spaces described alcohol as one of the few accessible coping tools in constrained environments. One stakeholder explained:

People experiencing multiple disadvantages... poverty, housing problems, domestic violence... use alcohol to deal with it. S B7

Participants and stakeholders also highlighted wider structural and commercial influences, including limited regulation and industry influence. One stakeholder commented:

The government are too worried about getting the taxes from the alcohol industry to do anything at a national or political level. S A4

Women also stressed limited alternatives: with constrained time, money and safe spaces, alcohol was often the most practical option for relief or leisure. Taken together, these accounts show that physical opportunity was shaped by alcohol-saturated environments and by inequality-patterned constraints on what else women could realistically access.

Logic model assessment

These findings suggest that while the earlier SPACES logic model recognised environmental influences, physical opportunity should be represented more explicitly as alcohol availability as well as unequal access to alternatives. This led us to refine the logic model so that environmental restructuring was not limited to reducing cues in the home, but also included attention to realistic, low-cost and accessible alcohol-free alternatives. The analysis extended the model's initial focus on environmental cues by drawing attention to the scale, immediacy and structural nature of alcohol availability, and to the inequality-patterned constraints that shape women's behavioural choices.

Theme 2: Social opportunity, norms and gendered expectations

Women described powerful expectations to drink embedded in motherhood, friendship networks, family traditions and work-related contexts. The 'mummy-wine' narrative was particularly influential:

Mummy needs wine... all the wine-mummy-drinks books... it makes you feel like you should be doing it. W F22

Not drinking often disrupted social identities or relationships. One woman noted:

Some friends ask me to do stuff less when I'm not drinking... they treat you differently. W D16

Cultural norms about alcohol appeared to intersect with ethnicity, migration histories and religious expectations. Women described navigating contradictory rules, for example, alcohol discouraged religiously but expected at social events, requiring careful attention to social safety and reputation. Early family and community practices also entrenched expectations. In reflecting retrospectively on the COVID-19 pandemic and its aftermath, participants described how social isolation and loneliness had reduced opportunities for connection and increased the perceived social value of drinking contexts. As one stakeholder noted:

People worry about how they'll fit in when they go down the pub or to dinner parties... it can feel very lonely initially; alternatives need to be embedded early. S C11

These pressures were not experienced uniformly; women's ability to refuse alcohol or avoid drinking contexts was shaped by cultural expectations, relationship dynamics, social safety and the risk of exclusion.

Logic model assessment

These findings highlight how social opportunity is patterned by gender, culture and relational dynamics. The original model recognised the role of social norms, but the present analysis helped to broaden this area by illustrating the depth, gendered nature and cultural variation of these pressures, as well as the social consequences women may experience when reducing or avoiding alcohol.

Theme 3: Automatic motivation and emotional inequalities

Across the dataset, women emphasised drinking as a way to manage stress, anxiety, insomnia, emotional overload, and caregiving strain. Emotional coping was also inequality-patterned, as women facing higher caregiving demands, financial stress, trauma histories or limited access to support described fewer realistic alternatives for relief. These emotional drivers appeared to be enduring features of daily life, particularly among women juggling parenting, employment and unpaid domestic labour.

I was using alcohol as a way to mask pretty much everything... mental health issues, financial struggles, raising children on my own. S C12

For some participants, alcohol also appeared to substitute for emotional connection or comfort during periods of loneliness:

When I drank, I got that warm feeling... as if I was loved by someone. S B7

It was my warm bath... a couple of sips and I'd feel calm—until later. W D14

For some, drinking was intertwined with trauma or long-term emotional strain:

People experiencing multiple disadvantages... use alcohol to deal with mental ill health.
S B7

Women described short-term relief followed by next-day anxiety, guilt or shame. Others contrasted life during drinking with life after stopping:

My panic attacks almost went completely when I stopped drinking. W D16

Logic model assessment

Emotional regulation was identified as a central mechanism shaping women's drinking, showing that automatic motivation appears to be strongly patterned by gendered emotional demands and the cumulative pressures many women face. While the earlier SPACES logic model acknowledged 'coping', these findings helped extend this understanding by illustrating the chronic, often intersecting emotional burdens that lead women to use alcohol as relief or escape.

Theme 4: Psychological capability, and cognitive inequalities

Participants described several barriers that could limit women's psychological capability to understand, reflect on, and act on alcohol-reduction information and support.

These barriers included uneven access to health information, limited menopause-specific advice, confusion about alcohol harms or units, and reduced cognitive bandwidth caused by stress, time scarcity and competing responsibilities.

Women described uneven access to health information, menopause-specific advice, and supportive environments where alcohol use could be openly discussed. Some discovered health information only *via* social media algorithms.

I started seeing on Instagram that alcohol is carcinogenic... I didn't know that. W D14

Drinking routines were tied to daily rhythms and described as deeply engrained and therefore hugely challenging to break.

Cook something, have a glass of wine; eat, have a glass; watch a movie, have a glass... it's ingrained. W G28

These routines also created cognitive barriers because women often needed to notice, interpret and interrupt patterns that had become automatic. Cognitive bandwidth was further eroded by stress, time scarcity and blurred work-home boundaries, especially during the pandemic. Attempts at moderation often provided insight about personal limits but also exposed how difficult it was to override automatic routines:

Each time people try moderation... they learn more and their self-efficacy improves. S C10.

Taken together, these findings show that cognitive barriers extended beyond factual knowledge gaps. They included health-literacy inequalities, limited access to relevant menopause and alcohol information, difficulty interpreting personal patterns of drinking, and the impact of chronic cognitive load on women's capacity to engage with planning, monitoring or other cognitively demanding strategies.

SheLogic model assessment

While the earlier SPACES logic model recognised the importance of 'knowledge' and 'skills', these findings suggested that psychological capability should be broadened to include cognitive barriers to engaging with support. The refined model therefore gives greater attention to health literacy, menopause-related understanding, habit awareness and cognitive load. This also informed the decision to present information in simple, personally relevant formats and to position self-monitoring and goal-setting as optional rather than core requirements, recognising that cognitively demanding techniques may be less feasible for women experiencing stress, overwhelm or time scarcity.

Theme 5: Reflective motivation: identity and stigma

Alcohol was identified as bound up with femininity, adulthood, sociability and reward. Identity-related barriers appeared to be patterned by gender, culture, class and recovery norms, shaping whether reducing drinking felt socially safe, acceptable or even imaginable. For many women, wine symbolised competence, self-care or social inclusion:

Every middle-aged woman that walks in asks about red wine... it signals an occasion, being included. S C10

Stigma surrounding labels such as ‘alcoholic’ discouraged early help-seeking. Women also described maintaining socially acceptable identities while concealing internal struggles:

We put on the mask... the mum, the boss... and hide struggle. S C12

For some, adopting a recovery-oriented identity was empowering; for others, reducing drinking threatened belonging or credibility within friendship groups, workplaces or families. Generational and cultural differences further shaped identity dynamics and the perceived social meaning of drinking or not drinking. Identity therefore appeared to be a key mechanism influencing whether, when and how women engage with alcohol-reduction support as well as their acceptance of new ways of being.

Logic model assessment

The earlier logic model included identity in a limited way, and these findings help expand and refine this component by showing how identity, belonging, stigma and gendered expectations interact to shape reflective motivation and women’s readiness or capacity to engage with change.

Across all five themes, the analysis suggests that while the earlier SPACES logic model identified several important influences on mid-life women’s drinking, the qualitative findings illustrate how these influences are shaped by structural, social, emotional, cognitive and identity-based inequalities. Integrating COM-B with this inequality-focused analysis allowed us to attempt to understand how these factors can constrain capability, opportunity and motivation affecting both drinking behaviours and the feasibility of engaging with alcohol-reduction support.

RQ3: Evidence for and against the behaviour change techniques (BCTs) in the initial SPACES logic model, including NoLo product substitution

Table 4 summarises the BCT appraisal, with the full evidence table provided in [Supplementary File 2](#). Several BCTs aligned closely with women’s lived experiences and were strongly endorsed, while others appeared useful only for some groups or required careful framing to avoid unintended consequences. Evidence for NoLo product substitution was mixed, with benefits in some contexts but drawbacks in others.

BCTs with strong support

Environmental restructuring, in particular removing alcohol from the home, or altering purchasing routines, was consistently described as effective:

If it’s not there, I don’t think about it. W H30

Alternative alcohol-free activities were also valued for providing social connection without cues:

We go swimming or sauna instead. W F24

Table 4. Summary of evidence for and against BCTs in the initial SPACES logic model (full evidence table in [supplementary file 2](#)).

BCT (from initial SPACES logic model)	Evidence for	Evidence against/ limitations	Overall assessment
Health information (harms, menopause, cancer risk)	Increased awareness prompted reflection and reconsideration of drinking	Knowledge alone rarely drove change; units guidance confusing or ignored	Include with adaptation. Use clear, simple, personally relevant information rather than unit-focused messaging.
Guidance on how to reduce drinking	Builds confidence through practice; helpful scripts for social situations	Early reduction attempts feel fragile; fear of social judgement	Strong support should include practical examples, scripts, and relatable scenarios.
NoLo product substitution	Helpful transitional “prop”; supports participation in social contexts	Can trigger cravings or feel unsatisfying	Include as optional – works for some, avoid presenting as universal solution.
Alternative non-alcohol activities	Strongly endorsed; provides connection without alcohol cues	Access varies; fear of losing social identity	Strong support and prioritise low-cost, realistic, accessible alternatives.
Environmental restructuring (reduce cues at home)	Very effective when feasible	Difficult if others drink in the home	Strong support but include, with strategies for shared households and digital delivery barriers.
Emotional & practical social support	Valued for coping and change.	Not always available; some relationships are unsupportive,	Strong support but ensure non-family/ online options for women with limited networks.
Identity-focused BCTs	Powerful when change is underway.	Can feel abstract early on.	Include with sensitivity and avoid moralising; use diverse, relatable role models.
Goal-setting (limits, plans) & self-monitoring	Useful for a minority who prefer structured approaches.	Often ineffective or guilt-inducing; breaks down in emotional/ habitual drinking contexts.	Optional and clearly communicate who is most likely to benefit.

Emotional support and peer-based strategies were widely appreciated, especially by women managing stress or grief:

Getting that advice... is massively helpful. S A2

These findings indicated strong support for BCTs that reduce exposure to triggers, strengthen social and emotional resources, and offer meaningful alcohol-free options.

BCTs with mixed or conditional support

Health-related information increased reflection for many women but rarely changed behaviour when drinking was driven by habit, stress or identity:

I used to know a heck of a lot [about health effects of alcohol]... and I was still able to go out and have a good skinful. S A4

NoLo products served as helpful substitutes for some, particularly in social settings, yet triggered cravings or felt unsatisfying for others.

Self-monitoring and goal-setting were useful for a minority but were often experienced as burdensome or ineffective when drinking to cope:

Two drinks in, all the rules go out the window. S A2

BCTs requiring careful adaptation

Emotion-focused strategies were welcomed when realistic and meaningful (e.g. talking to a friend), but dismissed when simplistic:

A bath wouldn't cut it for me. S C11

Identity-focused techniques helped women further along in change (e.g. identifying as a 'non-drinker'), but felt abstract or threatening earlier on.

Inequality considerations

Across all BCTs, participants highlighted patterned constraints that could limit effectiveness, including:

- Structural barriers (childcare, finances, shared housing) affecting environmental change or access to alternatives.
- Health-literacy differences shaping engagement with information-based techniques.
- Cultural and social norms influencing substitution, support-seeking and identity-related strategies.
- Time poverty and emotional load reducing feasibility of cognitive-heavy techniques such as tracking and goal-setting.

Overall, the appraisal indicated strong support for environmental restructuring, emotional/social support and alcohol-free alternatives; mixed support for health information, NoLo product substitution, self-monitoring and goal setting; and the need for tailored, sensitively framed identity- and emotion-focused strategies. These findings were used, alongside the COM-B mapping and inequality-related themes, to inform refinements to the SPACES logic model. RQ4 describes how these strands of evidence were translated into changes to the model's determinants, BCTs, delivery components and hypothesised mechanisms of action.

RQ4: How should the SPACES logic model be refined?

Analysis across RQ1–3 showed how the SPACES logic model could be strengthened by integrating three strands of evidence: COM-B mapped influences on drinking, inequality-related patterns shaping capability, opportunity and motivation, and focus group appraisal of the proposed BCTs. These insights informed the development of a revised SPACES logic model (Table 5; Figure 1), offering a more precise behavioural diagnosis and a more coherent arrangement of BCTs, mechanisms of action and delivery pathways.

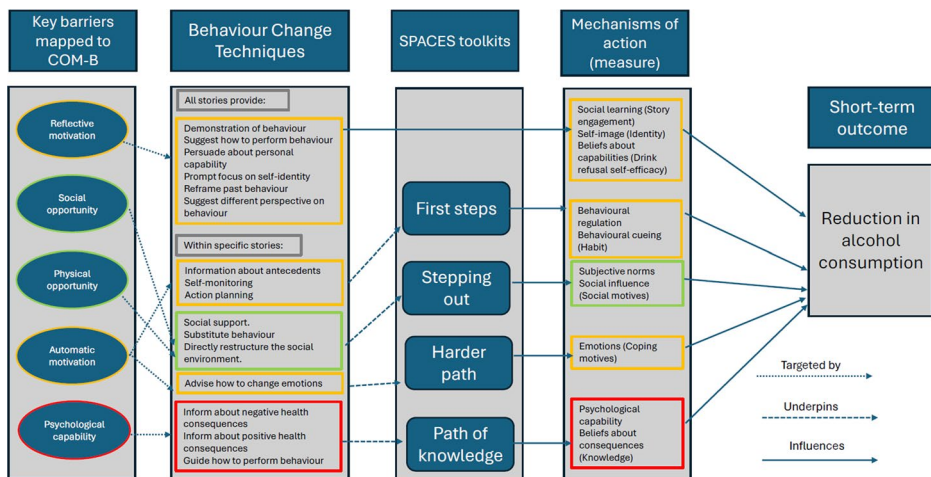
Table 5. Refined SPACES logic model showing COM-B components, intervention functions, BCTs, intervention components and mechanisms of action (MoA).

Influence	Function	BCT (s)	Toolkit/ section	MoA
Psychological capability				
Knowledge about risks	Education	Inform about negative health consequences BCIO_007179	Path of knowledge: Get informed & Myth busters, FAQs and quizzes	Knowledge
Knowledge about benefits	Education	Inform about positive health consequences BCIO_007183	Path of knowledge: Short term gains	Beliefs about consequences
Skills (Units)	Training	Guide how to perform behaviour BCIO_007050	Path of knowledge: Counting clearly & Myth busters, FAQs and quizzes	Skills
Physical opportunity				
Home environment	Env restructuring	Directly restructure the physical environment BCIO_007151	Stories	Behavioural cueing
Social environment (activities)	Env restructuring	Directly restructure the social environment BCIO_050346	Stepping out: Replacement activities	Environmental context and resources
MAcohol-free alternatives (drinks)	Env restructuring	Substitute behaviour BCIO_007095	Stepping out: Swap it out	Behavioural regulation
Social opportunity				
Cultural norms	Modelling	Present information from credible influence BCIO_007075	All stories	General attitudes/ beliefs
	Modelling	Prompt social comparison BCIO_007073	All stories	Subjective norms
Other people	Enablement	Social support BCIO_007028	Stepping out: Support circle & Community section	Social influence
Reflective motivation				
Self-efficacy	Persuasion	persuade about personal capability BCT BCIO_007137	Stories	Beliefs about capabilities
	Training	Set measurable behavioural goal BCIO_007300	First steps. Set your intentions	Goals
Self-efficacy	Training	Suggest how to perform behaviour BCT BCIO_007303	All stories	Beliefs about capabilities
	Persuasion	Demonstration of behaviour BCIO_007055	All stories	Social learning/ imitation
Drinker identity	Persuasion	Prompt focus on self-identity BCIO_007157	All stories	Self-image
	Persuasion	Draw attention to incompatible beliefs BCT BCIO_007057	Myth busters, FAQs and quizzes	Attitude towards the behaviour
	Persuasion	Identify self as a role model BCIO_007158	Community section	Self-image

(Continued)

Table 5. Continued.

Influence	Function	BCT (s)	Toolkit/ section	MoA
Intentions	Persuasion	Prompt comparative imagining of future outcomes BCIO_007070	Path of knowledge: Short term gains	Beliefs about consequences
	Persuasion	Reframe past behaviour BCIO_007056	All stories	Attitude towards the behaviour
	Modelling	Plan inclusion of enjoyment BCIO_007061	Stepping out: Replacement activities	Social learning imitation
Automatic motivation				
Drinking to cope	Training	Information about antecedents BCIO_007052	First steps: The Why Log	Behavioural regulation
	Training	Advise how to change emotions BCIO_007147	The Harder Path: Change how you feel, think, and what you do	Emotions
Habit	Training	Self-monitor behaviour BCIO_007024	First steps: The Drink Diary	Feedback processes
	Training	Action planning BCIO_007010	First steps. Set your intentions	Behavioural cueing
Stigma	Persuasion	Suggest different perspective on behaviour BCIO_007302	All stories	Attitude towards the behaviour / values

**Figure 1.** SPACES updated logic model diagram following focus group study and public involvement.**Refining COM-B within the logic model**

The updated model begins by strengthening the representation of the COM-B components most relevant to mid-life women's drinking. Psychological capability was broadened to include uneven health literacy, difficulties interpreting unit guidelines, menopause-specific misunderstandings, and constrained cognitive bandwidth documented in the data. Physical opportunity was expanded beyond environmental cues to further reflect the pervasive availability of alcohol which was not fully accounted

for in the original model. Social opportunity was refined to better capture gendered drinking norms, cultural expectations, and the real social penalties women may encounter when reducing drinking. Reflective motivation was refined to recognise the centrality of identity-based evaluations ('what sort of drinker I am') and deliberate reappraisal processes. Automatic motivation was refined to reflect the importance of stress, coping, habit and emotional load. These mechanisms were present in the original model, but the focus group data suggested these aspects should be emphasised.

Integrating inequalities into the logic model

Focus group data also demonstrated that the relevant COM-B components were patterned by multiple inequalities that influence both drinking behaviours and potential engagement with support. Structural inequalities may shape physical opportunity through differences in cost, availability, housing stability, childcare demands, and access to alcohol-free leisure. Social inequalities influenced social opportunity *via* cultural norms, community expectations, and the extent to which women might feel safe declining alcohol. Emotional inequalities appeared to affect automatic motivation, with stress exposure, caregiving load, trauma histories, and limited alternatives contributing to reliance on alcohol. Cognitive inequalities could constrain psychological capability, as time scarcity, competing demands and health-literacy gaps reduce the feasibility of cognitively demanding BCTs. Identity inequalities could shape reflective motivation through stigma, belonging, and expectations of femininity. Understanding these inequalities informed the logic model refinements and will inform work to understand future implementation of SPACES.

Clarifying how BCTs are delivered through stories and toolkits

A key refinement to the logic model involved clarifying how BCTs are delivered within SPACES. This distinction was informed by the focus group findings and BCT appraisal. Findings relating to identity, stigma, social comparison, credibility and emotional resonance suggested that stories were best suited to delivering BCTs that depend on relatability, modelling and recognition. In contrast, findings relating to cognitive load, habit, planning and constrained environments suggested that toolkits were better suited to BCTs requiring active reflection, practice or environmental restructuring. Although the original model proposed that BCTs would be embedded in stories and supported by toolkits, the focus group findings helped specify the distinct contribution of each component. The stories remained central, but their role was now more precisely defined: they will directly deliver the techniques that rely on relatability, identity, modelling, social comparison, credibility and emotional resonance. In practice, this means that BCTs such as presenting information from a credible influence or demonstrating behaviour are carried by narrative characters who offer realistic, recognisable examples of reducing alcohol consumption.

The toolkits, by contrast, were positioned as the vehicle for BCTs that required structured practice or active engagement, including self-monitoring, action planning, environmental restructuring and trying alternative activities. These appear in sections such as *First Steps*, *Stepping Out*, *Swap It Out* and *The Harder Path*. Rather than

privileging one component over the other, the revised model clarifies how stories and toolkits work together: stories generate motivation, insight and identification, while toolkits provide practical routes for enacting and sustaining change. This distinction also reflects the MRC's emphasis on ensuring that interventions are responsive to differing capabilities, opportunities and motivations across users (Skivington et al., 2021).

Refinements to the BCT set followed from this clearer understanding of delivery pathways and the evidence generated from the focus groups. Several techniques were retained but reframed, for example, information about harms remains part of the intervention but is now delivered in simplified, personally relevant formats rather than relying on numerical guidance. The broad 'substitution' category was separated into two components: NoLo products (included as an optional, context-dependent strategy) and alcohol-free activities. Emotional support and identity-related strategies were strengthened, reflecting their central role in women's experiences of change. Goal-setting and self-monitoring were retained but positioned as optional, recognising their limited acceptability among women drinking to cope with stress or overwhelm. Seven additional BCTs were added where the qualitative data provided strong evidence of relevance.

Finally, the revised logic model attempted a clearer mapping between BCTs and their mechanisms of action, enhancing theoretical coherence with COM-B and the Behaviour Change Intervention Ontology. These mechanisms represent the theorised pathways through which SPACES is expected to influence drinking behaviour and will be explored in subsequent phases of intervention development.

Discussion

This study aimed to refine the SPACES intervention logic model by examining whether the original model captured the full range of influences on mid-life women's drinking, how these influences were shaped by inequalities, and what the evidence suggested about the suitability of different BCTs. We believe that the refined model is more strongly grounded in qualitative evidence, more sensitive to the structural and social inequalities identified in the focus groups, more clearly aligned with COM-B, and more explicit in how stories and toolkits jointly deliver BCTs and mechanisms of action. These refinements provide a stronger behavioural rationale for the SPACES intervention and a stronger basis for prototyping and acceptability testing in subsequent work packages.

Summary of findings in relation to existing literature

Our analysis reinforces and extends our own and others' previous work showing that alcohol use among mid-life women is shaped by a complex interplay of structural, social, emotional and identity-based influences (Davies et al., 2025; Davies et al., 2026; Davies et al., 2024; Emslie et al., 2015; Jackson et al., 2018; Miller et al., 2022). Prior literature also documents the ubiquity of alcohol in women's everyday lives, including its positioning within care practices, reward rituals, motherhood narratives and social belonging (Jackson et al., 2018; Wright et al., 2022). The current findings also highlight how these influences are deeply patterned by inequalities in housing, income, health

literacy, cultural expectations and caregiving burden. Such insights align with evidence that socioeconomic disadvantage increases the harms associated with comparable levels of consumption (Angus et al., 2020). These patterns support calls for interventions that move beyond individual-level behaviour change to account for the wider social and structural context in which women drink (Apostolopoulos et al., 2018).

Our findings also resonate with emerging work on the emotional labour of mid-life women and the use of alcohol to manage stress, overwhelm, menopause-related symptoms, and cumulative strain (Davies et al., 2025; Hendriks et al., 2025; Shihab et al., 2024). Similar patterns are reported in qualitative studies describing alcohol as an accessible, efficient means of coping during periods of multiple role demands (Kersey et al., 2022). The prominence of emotional and habitual mechanisms strengthens the case for BCTs that support emotion regulation, stress relief and habit disruption, rather than relying predominantly on information-based or numeracy-based approaches.

The refinement of the logic model also contributes to emerging work on the value of stories in health behaviour change. Evidence suggests that narratives can reduce defensiveness, increase identification with characters and enhance engagement with intervention content (Brooks et al., 2022; Perrier & Martin Ginis, 2018). Although SPACES was always designed as a storytelling-based intervention, this study clarifies which BCTs may map most naturally onto narrative delivery, such as modelling, reframing, capability beliefs and identity work, and which require structured exercises or environmental prompts delivered through toolkits. This form of precision aligns with contemporary recommendations that logic models should specify not only 'what' techniques are used but 'how' and 'through what mechanisms' they are expected to exert their effects (Carey et al., 2019; Schenk et al., 2023).

Contribution to logic-model refinement and intervention design

Although logic models are now widely used in intervention development, the refinement process is rarely described in detail. Our findings illustrate the value of qualitative data in identifying under-represented mechanisms, challenging assumptions embedded in initial models and ensuring that proposed techniques align with the lived realities of target groups. By detailing the full refinement process, this study also provides a worked example of an inequality-sensitive, qualitative approach to logic model development. This may support other intervention developers seeking to operationalise the MRC Framework's expectations for iterative theory-building and transparent early-stage modelling. While the refined logic model sets out hypothesised mechanisms of action, these remain to be empirically tested in subsequent phases of the SPACES project.

Implications for practice and policy

The results reinforce the need for tailored alcohol-reduction interventions for mid-life women that address not only individual capability and motivation, but also the wider structural and social environments that shape drinking. Policies that reduce availability,

challenge gendered drinking norms, and expand accessible alcohol-free spaces may enhance the effectiveness of individual-level interventions such as SPACES. Similarly, services that incorporate menopause-specific education, emotional regulation strategies and trauma-informed approaches may better meet the needs of women whose drinking is driven by coping, stress or life transitions (Gomez et al., 2021; Sinclair et al., 2020). These contextual influences reinforce the need for multi-component interventions such as SPACES, which combine narrative engagement with practical tools to support behaviour change in constrained environments

Strengths and limitations

A key strength of this study lies in its iterative, evidence-driven approach to intervention development, drawing on diverse participant groups and stakeholders, consistent with established guidance on co-production and early-stage modelling in complex interventions (Hawkins et al., 2017; Michie et al., 2014; Skivington et al., 2021). The integration of qualitative analysis with the Behaviour Change Intervention Ontology provided conceptual clarity by linking proposed BCTs to specific mechanisms of action addressing a recognised gap in the transparency of logic-model development (Carey et al., 2019).

However, the study reflects a UK-based sample and may not be transferable to settings with different cultural norms, alcohol environments or service infrastructures, echoing concerns raised in wider literature on women's drinking practices (Kersey et al., 2022; Wright et al., 2022). Future work could explore how the refined SPACES logic model resonates with more diverse groups of mid-life women, including women from different ethnic, socioeconomic, geographical and drinking-status backgrounds.

Online focus groups enabled participation from women and stakeholders across geographical locations, but they may have excluded people with limited digital access, confidence or privacy at home (Flayelle et al., 2022; Simms et al., 2025). They may also have shaped group interaction differently from in-person discussions, particularly when discussing sensitive issues such as stigma, trauma and family life.

In addition, because SPACES is still in the development phase, the revised logic model requires empirical testing in later work packages to assess whether the hypothesised mechanisms operate as anticipated. The next stages of the SPACES project explored how the refined logic model could be translated into compelling narrative content, how these materials should be presented and how acceptable and meaningful they are to women in the target group, in line with recommendations for staged, iterative evaluation (Sekhon et al., 2017; Skivington et al., 2021).

Conclusion

This study demonstrates the value of integrating behavioural theory, qualitative evidence and inequality-sensitive perspectives to refine a logic model for a complex public health intervention. The revised SPACES logic model offers a clearer, more grounded account of how stories, toolkits and BCTs are intended to support alcohol reduction in mid-life women. By strengthening theoretical alignment and ensuring

relevance to women's lived contexts, the refinements presented should provide a strong foundation for subsequent stages of SPACES development and for future intervention work seeking to avoid exacerbating inequalities.

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Data availability statement

Data will be made available upon reasonable request from the authors.

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