

**Diffusion of New Psychoactive Substances:
understanding population motives, harms and
intervention needs**

Lucy Wallis

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

March 2018

Abstract

Background

Although there is a growing body of literature surrounding new psychoactive substances (NPS), and reasons for general use have been described, there is little understanding as to why certain NPS spread through user populations and become popular. This research used Rogers' 1962 diffusion of innovations theory (DOI) to help better understand the NPS market and how it is shaped and characterised.

Objective

The aim of this research was to explore the diffusion of NPS in the UK and why different NPS diffuse and others fail to do so, to identify appropriate public health interventions to reduce harm.

Methodology

A mixed methods approach was undertaken, which comprised four studies. The first study involved a critical analysis of the appropriateness of Rogers' DOI to explain the diffusion of NPS. This study was followed by two sets of interviews. The first interview study was conducted with NPS online retailers based in the UK. The second interview study involved interviews with NPS professionals including law enforcement professionals, drug policy organisations and NPS early warning system representatives from the UK, wider Europe, America and Australasia. These findings were analysed using thematic analysis. The final study was an online questionnaire and choice-based conjoint analysis with UK pre-existing recreational drug users aged between 18 and 35. These findings were analysed using Latent Class Analysis.

Results

The DOI was found to be applicable for the diffusion of an NPS product. However, the theory should be used in application to different individual NPS; NPS should not be classed as a homogenous group of substances and NPS users should not be classed as a homogenous group either. It was found that the theory should be updated in relation to NPS to include the influence of the internet. The key reason for the diffusion of an NPS was found to be the psychopharmacological effects of a product. However, there should also be an acknowledgment of the importance of friendship networks, and increasingly online forums. Even if a product had the desired psychopharmacological effects, if these are not communicated then it is unlikely to diffuse at a fast rate. Conversely, unless a product had the psychopharmacological effects desired by an individual, despite positive feedback from friends and online forums, it would be unlikely to diffuse.

The emergence of NPS did not have a transformative effect for all drug-using groups; instead, it affected different user groups in different contexts. Similarly, it is likely that the introduction of the UK Psychoactive Substances Act will not have a transformative effect on the use of NPS by all drug-using groups. Nevertheless, the changes in health and social harms associated with individuals accessing NPS through the underground market or choosing to use traditional illegal drugs should be recognised. Finally, the need to conduct research with a range of stakeholders, to gain a greater understanding of motivations for drug use to assist with future public health interventions, was an important finding of the thesis.

Acknowledgments

I would like to extend my sincere gratitude to Professor Harry Sumnall, Amanda Atkinson and Professor Judith Aldridge for their excellent support and supervision during my PhD. I would also like to thank my PhD friends for their kind support throughout my PhD. In addition, I would not have been able to conduct this PhD without the participants of this research. I would especially express my thanks to my interviewees who graciously gave up their time for my thesis research. Additionally, I would like to thank Sawtooth Software for their generous academic grant which they awarded to me to use their software. Without this grant, conducting my fourth study would have become a great challenge so I am extremely grateful to them. Finally, I would like to thank my family and friends who have provided exemplary support during these three years.

Contents

Abstract	1
Acknowledgments	3
List of Figures	10
List of Tables	10
Chapter 1: Introduction	11
Definition of NPS	11
Emergence of NPS	12
NPS prevalence.....	13
Global.....	13
UK.....	14
Methodological issues with measuring NPS prevalence and use	15
Difficulties associated with measuring prevalence through surveys	16
Alternative methodologies to measure NPS prevalence	16
Forecasting diffusion	18
NPS as a public health issue	18
Drug Policy	19
NPS drug policy in the UK	20
UK Psychoactive Substances Act	21
Problem to be investigated.....	21
Research questions.....	22
Structure of PhD	23
Chapter 2: Review of NPS and relevant theoretical literature	25
Rogers’ Diffusion of Innovations theory	26
DOI drug case study.....	26
Drug trends theories.....	27
Market.....	28
Users	29
Critique of the UK Psychoactive Substances Act.....	30
Diffusion	32
Scoping the NPS literature.....	33
Motivations for NPS use.....	34
Motivations for NPS use identified in the literature	36
Importance of the thesis	37
Conclusion	38
Chapter 3: Methodology	39

Introduction.....	39
Epistemological and ontological position	41
Study One: A Critical Analysis of Rogers’ Diffusion of Innovations Theory.....	42
Aim of Study.....	42
Methods.....	42
Study Two: Interviews with NPS Retailers	44
Aim of Study.....	44
Design	44
Recruitment.....	44
Methods.....	45
Analysis.....	45
Ethical considerations	46
Study Three: Interviews with Professionals.....	47
Aim of Study.....	47
Design	47
Recruitment.....	47
Methods.....	48
Analysis.....	48
Ethical considerations	49
Study Four: Choice-Based Conjoint Analysis of hypothetical NPS purchases	50
Aim of Study.....	50
Design	50
Recruitment.....	51
Methods.....	52
Questionnaire	52
CBC.....	53
Analysis.....	55
Ethical considerations	56
Chapter 4: Study One - A Critical Analysis of Rogers’ Diffusion of Innovations Theory	57
Introduction.....	57
The Innovation Itself.....	58
Relative advantage	58
Compatibility	66
Complexity.....	69
Triability.....	70
Observability.....	71
Communication Channels	72

Mass media channel.....	72
Interpersonal channel.....	73
Homophily and Heterophily.....	76
Time.....	78
Innovators.....	78
Early adopters.....	80
Early majority.....	82
Late majority.....	82
Laggards.....	83
Social System.....	85
Change agents.....	85
Opinion leaders.....	86
Limitations.....	89
Conclusion.....	90
Chapter 5: Study Two - Interviews with NPS Retailers.....	91
Retail Practice.....	91
Demographics of interviewees.....	91
Perceptions of the prevalence of NPS use.....	92
Retailers' websites and sales.....	92
Perceptions of the most popular NPS.....	93
'Responsible' retailing and role of retailers as harm minimisation agents.....	93
The UK Psychoactive Substances Act.....	95
Perceptions of the effectiveness of the Act.....	95
Perceptions of the motivations behind the introduction of the Act.....	96
Possession offence aspect of the Act.....	97
Perceptions of diffusion following the introduction of the Act.....	97
The Innovation Itself.....	99
Trialability.....	99
Compatibility.....	99
Relative Advantage.....	101
Communication Channels.....	108
Mass media channel.....	108
Interpersonal channel.....	110
Time.....	112
Innovators and early adopters.....	112
Early majority, late majority and laggards.....	112
Social System.....	114

Opinion leaders and change agents.....	114
Study Strengths and Limitations.....	115
Conclusion	116
Chapter 6: Study Three - Interviews with Professionals.....	117
NPS prevalence.....	117
Perceptions of the prevalence of NPS use.....	117
The definition of NPS	118
Diffusion	120
Mephedrone as a drug successfully diffusing in the UK	120
Other NPS successfully diffusing in the UK and internationally	121
The UK Psychoactive Substances Act.....	122
Perceptions of the motivations for the introduction of the Act.....	122
Perceptions of the Act.....	123
Perceptions of the criminalisation aspect of the Act.....	124
Tension with the Misuse of Drugs Act	124
The definition of psychoactivity	125
Perceptions of effectiveness of similar legislation introduced in other countries.....	126
The Innovation Itself.....	128
Compatibility	128
Triability.....	129
Relative advantage	129
Other reasons	139
Communication Channels.....	141
Mass media channel.....	141
Interpersonal channel.....	143
Homophily and Heterophily.....	148
Time	149
Innovators	149
Early adopters	150
Early majority	151
Late majority and laggards.....	151
Social System.....	153
Change agents	153
Opinion leaders	153
Conclusion	156
Chapter 7: Study Four – Choice-Based Conjoint Analysis of hypothetical NPS purchases.....	157
Questionnaire	157

Drug-related behaviours.....	157
Choice-Based Conjoint Analysis	161
Importance of attributes	161
Utilities.....	162
Results of the Latent Class Analysis.....	165
Differences in relative importance and part-worth utilities between the Latent Classes	166
Summary of findings.....	176
Study Strengths and Limitations	181
Conclusion	185
Chapter 8: Discussion.....	186
Research Questions.....	186
Summary of findings.....	189
The definition of NPS and prevalence	191
The Innovation Itself.....	193
Compatibility	193
Triability.....	194
Relative Advantage.....	195
Communication Channels	213
Interpersonal channel	213
Mass media channel.....	217
Homophily and Heterophily.....	219
Time	221
Innovators	221
Early adopters	222
Early majority	222
Late majority	222
Laggards.....	223
Social System.....	225
Opinion leaders	225
Change agents	225
The applicability of the Diffusion of Innovations theory to understanding NPS.....	227
Strengths and novelty of PhD	229
Recommendations for future research	229
Reflection and Limitations.....	231
Conclusion	232
References.....	234
Appendices.....	267

Appendix 1: Study One.....	267
Stage One Table.....	267
Appendix 2: Study Two.....	277
Study Two Table of Interviewees.....	277
Study Two Participant Information Sheet.....	277
Study Two Interview Guide.....	280
Study Two Analysis Themes.....	286
Appendix 3: Study Three.....	292
Study Three Table of Interviewees.....	292
Study Three Participant Information Sheet.....	294
Study Three Interview Guide.....	297
Study Three Analysis Themes.....	301
Appendix 4: Study Four.....	312
Study Four Participant Information Sheet.....	312
Study Four Questionnaire and CBC.....	315
Study Four Questionnaire Findings.....	320

List of Figures

Figure 1: The research process.....	40
Figure 2: Example of CBC question.....	55
Figure 3: Perceptions of different levels of likelihood of trying a product following influence by the media, friendship networks and online forums	159
Figure 4: Importance of different attributes of hypothetical drugs	161
Figure 5: Preferences for different attribute levels of hypothetical drugs.....	163

List of Tables

Table 1: Drug History	158
Table 2: NPS use by gender.....	158
Table 3: Importance of different attributes of hypothetical drugs	162
Table 4: Importance of different attributes by employment status	162
Table 5: Preferences for different drug category attribute levels of hypothetical drugs	164
Table 6: Preferences for different accessibility attribute levels of hypothetical drugs	164
Table 7: Preferences for different price attribute levels of hypothetical drugs	164
Table 8: Preferences for different desired effects attribute levels of hypothetical drugs.....	164
Table 9: Preferences for different side effects attribute levels of hypothetical drugs	164
Table 10: Results of Latent Class Analysis showing Bayesian Information Criterion Index	166
Table 11: Mean relative importance of each attribute within each Latent Class	166
Table 12: Part-worth utilities for each attribute level within each Latent Class	167
Table 13: Differences in socio-demographics, drug history, purchasing sources, drug forum use, and drug harm reduction practices between the Latent Classes.	170

Chapter 1: Introduction

The UK Psychoactive Substances Act (PS Act) was implemented in May 2016 in response to growing concern surrounding new psychoactive substances (NPS) use and harms in the UK. Its introduction suggested that previous powers and controls to reduce the availability and use of NPS in the UK had failed. This research seeks to explore the reasons why certain NPS products become popular in contrast to other products which fail to diffuse.

This chapter begins with an overview of the context and background that frames this thesis by defining NPS, examining the emergence and current prevalence of use, and discussing the challenges involved in measuring prevalence and use. Relevant policy on NPS in the UK is also explored. Following this, the purpose and key research questions of this research are stated and the mixed methods approach is described.

Definition of NPS

It is important to understand the problem and the scope of the issue of NPS. However, the definition of NPS is itself a debated term. It is acknowledged that there is not a universally accepted NPS definition (Sutherland et al, 2017) or a universal list of substances which fall under this term (Goodair et al, 2014). This can be emphasised through the challenges involved in categorising NPS. The United Nations (UN) categorise NPS in seven main categories, the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) categorise NPS into fourteen categories and the EMCDDA Early Warning System (EWS) use four main categories.

The definition of NPS has continued to expand to the extent that it now includes legal (under national law and international conventions) and illegal substances, and both synthetic and natural products, in addition to substances which are unintentionally taken as substitutes for traditional illegal drugs (Measham and Newcombe, 2016). The terms ‘new psychoactive substances’, ‘novel psychoactive substances’, ‘research chemicals’, ‘legal highs’, ‘herbal highs’, ‘designer drugs’, ‘synthetic drugs’, ‘bath salts’ and ‘smart drugs’ are all used in the literature. The term ‘legal highs’, which has been used by the media, has been criticised due to the inaccuracy of both the terms ‘legal’ and ‘highs’ (Corazza et al, 2013b). Reducing the emphasis on the legality of NPS, especially with the introduction of the PS Act in 2016, has moved focus towards the ‘new’ aspect of the definition (Measham and Newcombe, 2016). However, some of the substances included in the NPS definition are not ‘new’; for example mephedrone was first synthesised in 1929. Measham and Newcombe (2016: 578) have explained that the term ‘new’ relates to ‘new in terms of recreational use’ as the substances themselves are not necessarily new and some may even have had an ‘established... history

of pharmaceutical development' or 'new' relating to marketing. The different terms have different weaknesses: the term 'synthetic drugs' fails to include natural substances such as salvia divinorum (Miller et al, 2014) and conversely, the term 'herbal highs' has the opposite effect.

Van Hout and Hearne (2017: 102) stated that the term 'NPS' describes the 'multitude [of] compounds marketed as legally ambiguous alternatives to conventional illicit drugs'. Measham and Newcombe (2016: 580) defined NPS as:

'those drugs emerging or rising significantly in use after the 2008 mephedrone 'water-shed', starting with first generation synthetic cannabinoids and cathinones, followed by a widening array of substances that are typically uncontrolled to begin with'.

For this thesis, the definition of NPS focused on new synthetic drugs that appeared after mephedrone in 2008.

Emergence of NPS

To understand how external factors influence NPS diffusion, it is important to comprehend the original emergence of NPS and how NPS may differ from traditional illegal drugs. The emergence of NPS was described as 'one of the most interesting developments in the field of drug and alcohol studies in recent years' (Measham and Newcombe, 2016: 576). Reasons for the emergence of NPS include the decreasing purity levels of traditional illegal drugs (Vogels et al, 2009; Moore et al, 2013), the changes in technological and communication capabilities, including the internet, marketing (Davey et al, 2010) and the capacity of small (clandestine) laboratories to produce substances (Reuter and Pardo, 2017). Seddon (2014: 1020) explained that the internet provided an 'accessible and efficient mechanism' in which to allow a global market and marketing. Furthermore, the internet has enabled access to scientific literature which can be studied by 'street chemists' to synthesise products and evade the law (Seddon, 2014). The internet has also facilitated online forums and both clearnet and darknet websites which have affected the emergence and growth of the NPS market. The prohibition of traditional illegal drugs has also been suggested as a reason for the emergence of NPS (Dabrowska and Bujalski, 2013; Rolles and Kushlick, 2014). Although the emergence of NPS is accepted in the literature, the extent to which they have gained global popularity and within different countries is still uncertain. This is especially compared to the prevalence of traditional illegal drugs such as cannabis and ecstasy.

NPS prevalence

The degree to which NPS have affected the drug scene in different countries is discussed within the literature. For example, Zawilska and Andrzejczak suggested that they have ‘extensively dominated the drug scene’ in different parts of the world (2015: 13). Conversely, Chatwin (2017) argued that although NPS use is a priority in drug policy, prevalence rates for NPS use remain low. This point is emphasised by Sumnall et al (2013), O’Brien et al (2014) and Measham and Newcombe (2016). Additionally, Reuter described the use of NPS as ‘modest and localised’ (2011: 4) and Barnard et al (2014) stated that there was ‘geographical specificity’ relating to NPS use, where use is reported in ‘pockets’. Nevertheless, there are examples of certain NPS causing particular concerns in areas, including mephedrone in the UK and Benzylpiperazine (BZP) in New Zealand. Chatwin et al described these two examples as substances which have ‘successfully diffused into the street pharmacopeia’ (2017: 1). For certain population groups however, NPS use is higher. In the prison environment, it is possible that synthetic cannabinoid receptor agonists (SCRA) have replaced drugs such as cannabis, heroin and diverted pharmaceutical products in some prisons (Ralphs et al, 2016). In general, and based on the low population prevalence estimates, it would appear that even those NPS products which do diffuse only reach levels of ‘marginal use’ amongst the general population, whilst others stay on ‘the fringes’ and are only used by a small number of ‘drug enthusiasts’ (Stogner, 2015: 1; EMCDDA and Europol, 2013).

Global

The United Nations Office on Drugs and Crime (UNODC) described NPS as ‘proliferating’ the marketplace, in both quantity and diversity (2015: xvii). Between 2008 and 2015, 644 NPS were reported by 102 countries to the UNODC EWA (Early Warning Advisory) on NPS (UNODC, 2016). By September 2016, the UNODC EWA had received reports of over 730 NPS in more than 100 member states, which is more than three times the number controlled by the International Drug Conventions (Ifeagwu et al, 2017). Although detections have been made on all continents, the detection of new substances is largely concentrated in Europe and North America (UNODC, 2014).

The UNODC (2016) stated that a number of NPS do have a ‘stable presence in the drug market’ and these include JWH-018 (a SCRA), mephedrone and methylene (both novel psychostimulants). Nevertheless, the UNODC (2015) highlighted the transient nature of the market using the example of the tryptamine 5-MeO-DPT337, which was detected in police seizures and medical case reports between 2009 and 2012, but since 2012 there have been no reports. Currently, the global NPS market mainly comprises synthetic cathinones (mephedrone is the exemplar) and SCRA which represent over two thirds of the NPS market (Karila et al, 2015). This reflects the popularity of cannabis and stimulants (EMCDDA, 2015a). NPS trends develop in different countries at different times, and some

NPS products such as SCRA or mephedrone reach a ‘wider diffusion quickly’ whereas some remain in a single country and do not reach widespread use (Deluca et al, 2012: 225). Mephedrone is the most commonly used synthetic cathinone in Europe; in comparison, methylenedioxypropylvalerone (MDPV) and methylone are the most commonly used synthetic cathinones within the USA (German et al, 2014; Institoris et al, 2015; Smith et al, 2015).

In the European Union (EU), the EMCDDA has monitored more than 560 NPS since 2005, of which 380 have been detected in the previous five years (EMCDDA, 2016a). Although the number of substances being reported to the EU EWS has increased substantially (16 in 2005 and in 2016 this was at one new drug per week), the overall number of new detections made in 2016 was lower than in preceding years (EMCDDA, 2017). Overall, NPS use levels remain low in the general population of Europe (Pirona et al, 2017).

UK

The UK is described as ‘one of the biggest consumers’ of NPS in Europe and is also a large supplier for emerging NPS (Vermette-Marcotte et al, 2014). Recently, there has been a large amount of media attention focusing on the use of SCRA, especially among prisoners or vulnerable populations such as people who are homeless. Seizures in UK prisons have increased significantly from 2010 (Measham and Newcombe, 2016) and Her Majesty’s Inspectorate of Prisons (HMIP, 2015: 7) stated that SCRA represent the ‘most serious threat to the safety and security of the prison system’ in the UK.

The New Psychoactive Substances Review Expert Panel was appointed by the Home Office in 2013 to examine the emergence of NPS and to provide recommendations on legislative responses to government. The panel comprised members from different fields including academia, local authorities, medical experts and enforcement agencies (The New Psychoactive Substances Review Expert Panel, 2014). The Panel report described that the UK had seen a ‘fluctuating trend’ in identifying NPS products (2014: 7). The number of new NPS being reported to the UK government Forensic Early Warning System (FEWS) in 2014/15 was four and there had been a steady decrease since 2011/12 when seventeen substances were identified. Although additional substances were identified, these were not included as they were identified at EU level (Home Office, 2015b).

Questions on NPS use were first included in the 2010/11 Crime Survey for England and Wales (CSEW) after mephedrone was classified under the 1971 Misuse of Drugs Act (MDA). The CSEW now however, only includes a ‘general NPS use’ question. In the CSEW 2016/17 (Home Office, 2017a), 1.2% of individuals aged between 16 and 24 had used an NPS in the previous year, which

was a statistically significant decrease from the 2015/16 CSEW where use was 2.6%. Furthermore, 0.4% of individuals aged between 16 and 59 had used an NPS in the previous year, again, which was a statistically significant decrease from the 2015/16 CSEW. For lifetime prevalence, 2.4% of individuals aged between 16 and 59 had used an NPS in their lifetime, which was again a decrease, although non-statistically significant, from the previous year. In comparison, individuals aged 16 to 24 were approximately twice as likely to have used NPS in their lifetime (4.2%). Again, this was a statistically significant decrease from the previous year where lifetime use was at 6.0% for this age group (Home Office, 2017a). It should be acknowledged that these surveys measure self-reported intentional use and therefore unintentional exposure is underestimated. For example, individuals consuming an NPS which they bought as being as a traditional controlled drug would not be included. In the 'Smoking, drinking and drug use among young people in England in 2014' survey of English school children, 2.5% of pupils aged between 11 and 15 had taken NPS at least once, 2.0% had taken them in the previous year and 0.9% had done so in the previous month (Fuller, 2015). These figures increased proportionally with an increase in age.

Public interest (indicated by media reports) in mephedrone reached its peak in the UK between 2009 and 2010 (Winstock et al, 2011). Furthermore, it was the most frequently mentioned substance between 2011/12 and 2012/13 in telephone enquiries to the UK's National Poison Information Service (NPIS) and TOXBASE accesses (Stephenson and Richardson, 2014). The 2010/11 British Crime Survey estimated last year use among 16-24 year olds at 4.4%, at a similar rate to that of cocaine and MDMA use (Home Office, 2011). However, annual UK prevalence data shows that use has now fallen below MDMA use in recent years (Home Office, 2017a).

Methodological issues with measuring NPS prevalence and use

Research in the area of NPS, especially estimating prevalence, is challenging. Challenges relating to NPS product branding include the use of the same brand name to describe different substances in different countries or at different times, or conversely different brand names to describe the same substance (Ramsey et al, 2010; Davies et al, 2010; Corazza et al, 2014b). Furthermore, the dynamic nature of the NPS market means that general population survey questions which mention specific products quickly become out of date (Young et al, 2015). The limitations of the CSEW are highlighted in relation to mephedrone where the 'rise and fall' of the drug happened within one cycle of the survey (Measham et al, 2011: 28). The challenges associated with research into drug use prevalence in general includes the involvement of the underground market (Dybdal-Hargreaves et al, 2013) and the stigmatized and hidden nature of drug use in general (Griffiths et al, 2000; Burns et al, 2014a).

Furthermore, the detection of a substance by police, toxicologist or forensic science services does not equate to an established market (Wood et al, 2012; UNODC, 2014). For example, NPS may have been used unintentionally in place of traditional illegal drugs such as MDMA or amphetamine (Brunt et al, 2017). Users may also sometimes struggle to identify the substance they have taken (UNODC, 2015). For example, in the study conducted by Measham et al (2011) in the night-time economy of towns in the North West of England, participants were unsure as to the difference between mephedrone and ‘Bubble’, which was a local term for a generic white powder, or whether they were the same substance. To address this issue, participants in the CSEW have now been asked about the appearance and form of the NPS they have taken, and how the drug was obtained.

Difficulties associated with measuring prevalence through surveys

The use of general population surveys has evident limitations in measuring use among under-represented groups such as problematic drug user groups, hidden populations such as individuals with mental health issues, or excluding key groups such as students (Sumnall et al, 2011; Pirona et al, 2017). To estimate prevalence of use in these groups, targeted and non-representative studies are more appropriate (Pirona et al, 2017). These types of survey are not representative of the general population however, which makes estimating NPS prevalence for policy monitoring purposes difficult (EMCDDA and Europol, 2013; McAuley et al, 2015).

Comparing prevalence of use between countries is also difficult. There are no accurate global estimates of NPS due to limited data being available from a small number of countries and with respect to a small number of substances. Where NPS are included in national surveys, the use of different methodologies, definitions of NPS and legal status differences makes comparison difficult (Martinotti et al, 2015; McAuley et al, 2015; Pirona et al, 2017). For example, the use of law enforcement data as a comparison is problematic because of the differences in legal status of NPS and policing priorities.

Alternative methodologies to measure NPS prevalence

The use of the internet to monitor trends

The internet is a useful tool to monitor NPS (Burns, 2014a). The use of ‘web-monitoring activities’ is described as ‘essential for mapping the diffusion of NPS’ (Corazza et al, 2013a: 317). Monitoring online user forums for descriptions of NPS products and their effects may provide a ‘more credible real-time’ source of information than laboratory tests (Barnard et al, 2014: 17). Through appropriate internet monitoring systems it is possible to identify when products become popular online (Deluca

et al, 2012). The use of internet surveillance to monitor public health trends is seen as having ‘feasibility’ especially for drug researchers and policymakers monitoring NPS emerging trends because of the ‘real-time’ data it can provide (Curtis et al, 2015: 107). It should be used to detect and prioritise signals of harm and communicate these risks effectively (Evans-Brown and Sedefov, 2017).

Internet snapshot surveys are an example of a monitoring methodology, and they focus on the availability and price of NPS products in the online marketplace (Sedefov et al, 2013; Vermette-Marcotte et al, 2014; Mahaptra and Sharma, 2016). Aldridge and Décary-Héту (2016) also highlighted the importance of incorporating the monitoring of sales on cryptomarkets to improve early warning monitoring systems. Although the data derived from internet sources are already in place, the incorporation of sales figures from cryptomarkets could improve understanding of availability and actual use (Aldridge and Décary-Héту, 2016).

Monitoring systems

The components of emerging drug use trend monitoring systems also include routine or secondary data sets such as arrest, seizure or forensic drug testing data, expert sources and the media (Mounteney et al, 2010). The triangulation of data and incorporation of different information sources partly addresses the difficulties in monitoring drug use. Monitoring systems have become comprehensive and well established in Australia and the USA (Mounteney et al, 2016) and the EMCDDA was originally established by the EU to collate and disseminate information on the drugs situation in Europe (Mounteney et al, 2016). However, there are variations in quality and quantity of reporting in each European country. In the UK, the EMCDDA’s EWS has been in place since 2011 and monitors detections of NPS which may help to identify early trends in NPS (EMCDDA, 2012; Home Office, 2015b).

Other tools for measuring NPS prevalence

In addition to monitoring systems and surveys, data on NPS prevalence can be obtained through medical case reports and techniques such as wastewater analysis. There are a large number of studies in the literature focusing on different analytical techniques such as mass spectrometry or infrared spectrometry. Sumnall et al (2013) warned that the use of epidemiological techniques such as wastewater analysis should be viewed as useful for local or regional prevalence estimates, but not as national public health monitoring strategies. Furthermore, the speed of the changes in the market, and if substances are brand new, equates to challenges for detection and identification tools (Elliot and Evans, 2014; Racz et al, 2016).

Medical monitoring systems are also described as a ‘useful indicator’ of NPS use in relation to other substances (Sumnall et al, 2013). Although these types of system are more common in the USA than in Europe. Drug treatment service presentations provide useful sources of NPS information but data is problematic. For example, low treatment provision for users of NPS may be due to low NPS prevalence, a low level of problematic use, poor identification of treatment need or a lack of appropriate services for users (Pirona et al, 2016). Accessing accurate data on emergency hospital admissions from NPS and ‘club drug use’ is also challenging for different reasons such as the lack of ICD-10 (International Classification of Diseases) codes specifically for NPS (Abdulrahim and Bowden-Jones, 2015).

Forecasting diffusion

To minimise potential harms from widespread use of a diffused NPS product, it is necessary to try and ‘forecast’ the likely market success of a newly introduced NPS in order to help to prioritise decision-making. Effective NPS forecasting involves directing attention towards NPS products which are associated with the greatest harms, which may result from high levels of population use (Stogner, 2015) or substances with lower use, but greater risk of harm. Risk assessments (explored in the next section) have been conducted on substances where there is no evidence of widespread use but there have been deaths occurring among certain groups. The accuracy of forecasting drug trends in general is questioned in that there may be many ‘false positives’ (Stogner, 2015: 2). Therefore in monitoring drugs, it is important to distinguish between a substance becoming a trend and random fluctuations in popularity (Griffiths et al, 2000).

NPS as a public health issue

In 2015, 204 deaths were reported involving NPS in the UK, and this was an increase from 2013 (60) and 2014 (163) (Home Office, 2016). Although this figure is low compared to the deaths from heroin, methadone or cocaine poisoning, the figure has been rising since 2011 (National Assembly for Wales Health and Social Care Committee, 2015). King and Nutt (2014) suggested that deaths resulting from NPS use are overestimated but this also relates to the challenges of defining NPS. Evans-Brown and Sedefov (2017) acknowledged that whilst outbreaks of NPS mass poisonings are rare, they highlighted an example in Poland in 2015 where more than 200 people were hospitalised over a period of only a few days after smoking a SCRA product called ‘Mocarz’. The increase in mass poisonings from SCRA consumption has increased recently despite a decrease in use prevalence and the reasoning behind this, for example the usage patterns, needs to be determined (Keyes et al, 2016). The problematic use of SCRA by vulnerable groups such as prisoners and homeless populations

represents a public health challenge. In the UK, this was originally linked to the previous ease of accessibility through headshops or the internet, although since the PS Act these sources have been replaced by illegal sales.

The emergence of NPS has been described as a ‘substantial global threat for public health’ (Deligianni et al, 2017: 1; Santacroce et al, 2015; Fletcher et al, 2016; Pirona et al, 2017). Other concerns include the lack of education and knowledge surrounding substances, and the lack of knowledge on both short and long-term effects and harms (Coppola et al, 2016). Consequently, emergency medical departments lack information as to how to treat individuals who have adverse reactions. In addition, because of the transience of the market, developing health assessments or control policies for a particular substance is challenging (Bruno et al, 2013). Coppola et al (2016) stated that in a number of cases, NPS that have appeared on the recreational drugs scene were originally developed as medicines but were abandoned by manufacturers because of their severe side effects. Therefore, there is a need for increased training and guidance on NPS for the professionals who are interacting with users (Pirona et al, 2016).

The relationship between NPS and public health is demonstrated through the risk assessments undertaken by the EMCDDA. These include reviews of the pharmacology, social risks, individual and public health risks, patterns of use and manufacture of the substance. The EMCDDA will only conduct formal risk assessments for substances which are suspected of causing significant harm (EMCDDA, 2015b). Since 1998, nineteen risk assessments have been carried out. These risk assessments have included BZP, mephedrone and more recently, in 2015, alpha-Pyrrolidinovalerophenone (a-PVP). The most recent risk assessment at the time of writing was for MDMB-CHMICA in 2016. This was the first SCRA to be risk assessed by the EMCDDA. Although SCRA and synthetic cathinones comprise the majority of substances monitored by the EMCDDA, both on a global scale and European scale, in 2015 substances began to emerge which did not belong to the synthetic cathinone or SCRA group but to synthetic opioids or sedatives (UNODC, 2016). The EMCDDA (2016a) stated that NPS producers are now increasingly targeting the more problematic sectors of the drug market, for example through uncontrolled fentanyl.

Drug Policy

Chatwin (2017: 112) stated that NPS have become ‘a driver for changing drug policy landscapes’ and a range of policy responses have been used internationally to address NPS use. The EMCDDA (2015c) have identified three different legislative responses implemented in Europe: the use of existing laws, the modification of existing laws and the introduction of innovative new laws (EMCDDA, 2015c). Legislation has included generic and analogue models for controlling

substances, the introduction of emergency legislation to ban substances for a time period to assess the substance and the introduction of 'blanket bans'. Chatwin (2013) emphasised that the different approaches to NPS regulation in Europe have extended to traditional drugs regulation as well and this makes it challenging for the EU to promote drug policy aims. For example, in 2001, Portugal decriminalised the possession of all drugs for personal use, whilst Sweden continued a zero tolerance approach to drug use.

NPS drug policy in the UK

In order to place the PS Act in context it is important to examine previous UK legislation and policies to address NPS. Before the introduction of the Act, NPS were controlled under the 1971 MDA on an individual or generic basis. Up to 500 substances were controlled under this Act (Home Office, 2015d). However, due to the speed in which substances were appearing and the length of the advisory and the parliamentary process of classifying a new substance (sometimes taking up to 18 months), successive governments argued a new process to address these potentially harmful substances needed to be introduced. Consequently, in 2011, the Police Reform and Social Responsibility Act amended the MDA to allow for temporary class drug orders (TCDO) (Home Office, 2015c). A substance could be subjected to a TCDO when the Home Secretary, having consulted with the Advisory Council on the Misuse of Drugs (the ACMD), believed that it was likely to be misused, or caused harmful effects. Under a TCDO, a substance is classified as a controlled drug under the MDA for up to twelve months to allow for the ACMD to further review the substance and prepare advice for the Home Secretary (Home Office, 2015c). Initially this was a six-month period, however it was extended, as six months was not deemed enough time to collect sufficient evidence.

The 2017 UK drug strategy proposed how the UK government and its local, national and international partners would address drug misuse and associated harms. There is frequent reference in the strategy to the homeless population as a priority group at greater risk from the most dangerous NPS (HM The Government, 2017). Consequently, the government stated that they would work with the homelessness sector to address this issue. A second vulnerable population identified as having higher use rates of NPS was the prison population. The government stated that NHS England had conducted a review on substance misuse treatment in prisons and consequently, they have increased the focus of provision on NPS (HM The Government, 2017). The government also highlighted their actions to address the NPS issue which included the introduction of the PS Act, development of local toolkits and 'world-leading NPS treatment guidelines' (2017: 14).

The government stated that they are 'leading the global response to NPS' and although they believed significant progress had been made recently, there was still a 'long-term plan' to meet the

challenges created by NPS (HM The Government, 2017: 39). The strategy highlighted the success of the UK in securing the control of mephedrone under the UN drug conventions, which was the first control of a NPS (HM The Government, 2017). The UK is described as having prominence in drug policy affairs internationally and therefore the choice made to introduce the PS Act is likely to have global scale implications (Reuter and Pardo, 2017).

UK Psychoactive Substances Act

During the period of this PhD research, the legislation surrounding NPS in the UK changed significantly. The market went from quasi-legal to illegal with the introduction of the 2016 PS Act in May 2016. The Act comprised a blanket ban on the production, distribution, sale and supply of psychoactive substances in the UK, which included the majority of NPS. The intended effects of the Act were to ‘end the legal sale of NPS from high-street retailers and UK based websites, reduc[e] NPS availability; greater public awareness of the risks of NPS from a clear legal stance; and a reduction in the harmful consumption of NPS’ (Home Office, 2015a: 1). The introduction of the Act in the UK is similar to earlier legislation introduced in Ireland, Poland, Romania, and certain states in Australia. The PS Act will be explored in greater depth in the next chapter.

Problem to be investigated

Explicit *general* reasons for NPS use have been described in the literature. For example, NPS are perceived as higher quality by users (and researchers), or act as legal substitutes to illegal drugs. Additionally, NPS use has been described with respect to prevalence and availability. There is little understanding however, as to *why* certain NPS diffuse and become popular, whilst others do not. Furthermore, there has been little attention paid to the application of relevant theory to help understand the diffusion of NPS. This PhD used Rogers’ 1962 diffusion of innovations theory (DOI) as a basis of investigation. This is a sociological theory used to understand how an idea or product, such as NPS, becomes widespread in a population over time. This thesis focused on the dynamic nature of the NPS market and how it is shaped and characterised. The research identified motivations for NPS use and provides an understanding of some of the decision making underlying NPS use. The findings of this thesis may contribute to the development of targeted public health interventions and appropriate policy interventions.

It is important to highlight the framing of this thesis in relation to Rogers’ DOI theory. The PS Act 2016 was introduced in May 2016 during the conduct of the research which underpins this thesis. Before the introduction of this piece of legislation, NPS were distinct from drugs controlled under the Misuse of Drugs Act 1971 such as cocaine or cannabis in that NPS were sold in headshops or

clearnet websites with a quasi-legal status. This is in contrast to controlled drugs which were subject to a number of offences and sold through illicit markets. This is the primary reason why NPS were treated as a separate entity to traditional illegal drugs for application of Rogers' DOI in this thesis. However, the legal changes brought about through the PS Act, which involved a blanket ban on NPS, meant that this distinction became less pronounced. The changes brought about through the Act are acknowledged in the critical analysis (Study One) but the distinction between NPS and traditional illegal drugs in terms of legality and accessibility are still recognised as they were applicable before the Act was introduced and are also applicable in countries which have not introduced a blanket ban. Furthermore, there are some distinctions between NPS and other controlled drugs, such as that the PS Act did not introduce a possession offence, although possession in secure setting (e.g. prisons) is an offence.

Additionally, NPS were framed as a consumer product and so examination of the NPS market in this context meant that not all NPS user groups were considered. The application of the DOI to NPS for this thesis related to lower-risk drug users with freedom of choice relating to decisions surrounding NPS choice and use. Therefore this work may not be necessarily applicable to all NPS user groups, especially problematic or vulnerable drug users (e.g. prisoners or street homeless). Nevertheless, NPS use by these groups is still referred to in this thesis where appropriate and their position within the adopter categories in Rogers' DOI is still undertaken.

Research questions

The aim of this research was to explore the diffusion of NPS in the UK. It was anticipated that through investigating and gaining a better understanding of why some NPS diffuse and others fail to diffuse, this would lead to the identification of appropriate public health interventions to reduce harm. To address this aim, four key research questions were addressed:

- Is Rogers' Diffusion of Innovations theory applicable to NPS?
- According to the theory, what are the reasons why some NPS diffuse and others fail to diffuse?
- Do external factors, such as drug policy, including the 2016 UK Psychoactive Substances Act, influence diffusion?
- Which of Rogers' adopter categories might be most at risk of harm from NPS use?

Structure of PhD

A mixed methods approach was undertaken. The thesis comprised four studies, three of which were qualitative and one which was quantitative. The first study was a critical analysis of the appropriateness of Everett Rogers' 1962 DOI theory in describing the diffusion of NPS. Following this, two sets of interviews were conducted, one with online NPS retailers and one with professionals working in the area of NPS and drug policy and practice. Interviews were conducted with three UK-based retailers and twenty professionals from the UK, wider Europe, Australasia and the USA. These took place through a variety of different methods including telephone, the video-calling platform Skype and through face-to-face interviews. The findings from the interviews helped shape questions for a choice-based conjoint analysis (CBC) conducted with current drug users in the final study. One hundred and ninety individuals aged between 18 and 35 and living in the UK comprised the final sample. The involvement of different stakeholder groups was important in conducting this research to ensure that a range of viewpoints on the diffusion of NPS was explored.

The thesis is structured as follows:

Chapter 1: Introduction: This chapter reviews the definition, emergence and current prevalence of NPS; the challenges involved in measuring prevalence and use; current UK NPS policy; the purpose of this research; the key research questions for this thesis and the structure of the thesis.

Chapter 2: Literature Review: This chapter comprises a brief examination of the DOI and other relevant drug diffusion theories; the NPS market; different NPS user groups; the UK PS Act; conceptualisation of NPS diffusion; existing literature exploring motivations for NPS use; and the importance and contribution of the thesis.

Chapter 3: Methodology: This chapter comprises the rationale for each method and a detailed explanation of the research methods used in each of the four studies. This includes an in-depth explanation of the procedures implemented in each study relating to sample, data collection and analysis. The ontological and epistemological position of the researcher is also examined.

Chapters 4-7: Results: These chapters comprise a detailed description of the data collected and analysed for each study. This relates to data collected in relation to Rogers' DOI theory, perceived prevalence of NPS and perceptions of the PS Act.

Chapter 8: Discussion and Conclusion: This chapter discusses how the findings of the thesis answered the research questions. A summary of the key findings of the thesis is provided, focusing on the applicability of Rogers' theory in relation to NPS in accordance with the findings of the four research studies. The novel contribution of the thesis is highlighted, strengths and limitations of the

research explored, and recommendations for future research are provided. Finally, the conclusion of the thesis is provided.

Chapter 2: Review of NPS and relevant theoretical literature

This literature review involved conducting searches on databases Science Direct, JSTOR and PubMed. The websites of key organisations such as the EMCDDA, the UNODC and the UK Home Office were also searched for appropriate articles. Key words used in the literature search included the various definitions of NPS: *new psychoactive substances*, *novel psychoactive substances*, *bath salts*, *synthetic cannabinoid receptor agonists*, *SCRA*, *legal highs* and *designer drugs*. The scope of the search included international papers in the English language, as the thesis was not limited to a UK perspective. Articles chosen as being relevant were then ranked as to their level of relevance: ‘very relevant’, ‘moderately relevant’ and ‘less relevant’. For example, a large number of articles regarding NPS solely focused on their chemistry or forensic detection, and these were not included. The key relevant articles were then reviewed and the reference list of each article was assessed to identify any articles not already identified. Where articles were identified these were reviewed and ranked in accordance to their relevance. Articles were not included if they were over five years old unless they were ranked as ‘very relevant’. The reason for this exclusion criterion was due to the transient nature of the NPS market and the changes in legislation which had taken place in the preceding five years. Articles were assessed as to whether they addressed an aspect of one of the four key research questions:

- Is Rogers’ Diffusion of Innovations theory applicable to NPS?
- According to the theory, what are the reasons why some NPS diffuse and others fail to diffuse?
- Do external factors, such as drug policy, including the 2016 UK Psychoactive Substances Act, influence diffusion?
- Which of Rogers’ adopter categories might be most at risk of harm from NPS use?

This literature review begins by defining the DOI and identifying alternative drug diffusion theories. Different aspects of the NPS issue are then explored: the market itself and the different NPS user groups. The area of drug policy is examined relating to perceptions of the 2016 UK PS Act. Finally, the literature is reviewed in relation to addressing diffusion and the motivations for NPS use.

It should be noted that a critical analysis forms Study One of this thesis and therefore key literature is reviewed in that chapter.

Rogers' Diffusion of Innovations theory

This thesis is framed by Everett Rogers' 1962 DOI. A critical analysis of this theory forms the basis of Study One, nevertheless it is necessary to briefly explain the theory. The DOI is a sociological theory which describes the process underlying the adoption, and the rate of adoption, of new innovations. An innovation is an idea, practice or object that is perceived as new by an individual or other unit of adoption (Rogers, 2003). Rogers (2002: 990) defined diffusion as the process 'through which an innovation is communicated through certain channels over time among the members of a social system'. Consequently, the DOI is characterised by four elements: the innovation itself, communication channels, time and the social system. Additionally, there is a five-stage process in the successful diffusion of an innovation: knowledge, persuasion, decision, implementation and confirmation. The innovation itself incorporates the five attributes which determine the rate of adoption of innovations: relative advantage, compatibility, complexity, trialability and observability. The communication channels involve the mass media and interpersonal channels. The time aspect of Rogers' theory identifies five adopter categories which are innovators, early adopters, early majority, late majority and laggards. The final component of Rogers' theory, the social system, includes individuals who influence the diffusion process: opinion leaders and change agents.

An NPS may be considered an innovation of the drugs market and may diffuse through the population in accordance with the DOI. Drugs are an appropriate subject for applications of the theory because of their global spread and market (Ferrence, 2001). Additionally, Ferrence (2001: 165) suggested that conducting more 'rigorous designs' of applications would be beneficial to both policymakers and public health stakeholders. The application of the DOI relates to the application of NPS as a consumer product and understanding the motivations for choosing a particular NPS. NPS are subjected to the same influential factors as other consumer products which are seen as 'new' and therefore the theory is appropriate in testing its robustness in explaining the diffusion of NPS.

DOI drug case study

An example of how the DOI could be applied to a drug is provided through the history of mephedrone. In terms of the innovation itself, it is important to compare mephedrone to other substances already in existence when it emerged in the mid 2000s. Thus it can be highlighted that when mephedrone emerged and widespread use occurred in the UK, it was noticeable that it took place at a time when there was low availability and purity of more traditional illegal drugs such as cocaine and MDMA (Brunt et al, 2011). Therefore mephedrone could be seen to have offered relative advantages over existing products. Additionally, mephedrone was seen as having reliable purity and enjoyable effects with, at least initially, low levels of undesired side effects. In terms of the other

components of Rogers' innovation itself, the form of mephedrone was also compatible to existing drug users which also limited the complexity associated with use and ease of adoption. In relation to communication channels, the mass media was seen as playing a role in alerting individuals to the idea that mephedrone was sold legally, before it was banned, when news stories reported harmful consequences of mephedrone use which alerted individuals to means of purchase. In relation to time and adopter categories, mephedrone could be seen to have first emerged among psychonauts before becoming popular among early adopters and then diffusing among the other adopter categories. In terms of the social system, opinion leaders in particular would have influenced other members of the social system to trial, and then adopt mephedrone.

Drug trends theories

Although the DOI was chosen to analyse diffusion of NPS, other theories have also been previously used to describe drug trends.

Theories applied to shifting drug trends all involve multiple factors which 'shape the trajectory of use of a particular drug over time' (Bilgri, 2016: 7-8). Examples of alternative drugs trends theory have been examined in the literature and an example of this is 'trend theory' which was developed by Agar and Reisinger (2001). Trend theory exists as a:

'conceptual scheme to explain trends in illicit drug use... The goal was to explain increases and decreases in the popularity of specific drugs of interest during specified time periods by integrating ethnography and epidemiology' (Agar, 2003: 977).

The work of Agar and Reisinger on 'narrative mechanisms' (2004: 262) explored the importance of peer accounts when a new drug appears and individuals rely on peer accounts of personal experience to evaluate the drug (Bilgri, 2016). The authors (2004) explained that an 'interesting drug' would generate more positive evaluations among individuals predisposed to experiment with new drugs. However, over time negative accounts will emerge and therefore a drug will shift in a negative direction as side effects become more apparent (Agar and Wilson, 2002) and this will stop the rising curve of experimentation (Agar and Reisinger, 2004). Consequently, it may be that a key influence on drug use is 'folk perceptions of the acceptability of the drug' (Carlson et al, 2004). The importance of the 'narrative mechanisms' being embedded in the peer accounts of the drug among users and affecting its perceived attractiveness results in the perception, culture and subculture being as important to the popularity of a drug as its psychopharmacology (Hunt et al, 2013). The importance of global communication results in this interconnectivity and speed of the stories spreading becoming faster which increases the speed of drug epidemics spreading (Agar and Reisinger, 2003). This theory

includes a key aspect of the DOI in the form of interpersonal channels, however the importance of the attributes of the innovation itself are not thoroughly addressed and these are arguably one of the key aspects of successful diffusion.

A second theory used to explain drug trends was developed by Johnston (1991) who explored the phases of the North American drug epidemic. Johnston (1991) suggested that there were five conditions necessary for the expansion of an epidemic: ‘awareness of a drug and its psychoactive potential’, ‘access’, ‘motivation’, ‘reassurance’ and ‘willingness to violate social norms’. This theory appears to cover more aspects of why a drug may diffuse as it includes reasons such as curiosity, the benefits of a drug outweighing the risks and availability. Johnston (1991) also identified four public roles which would influence the expansion of the epidemic: ‘proponents’, ‘reassurers’ (such as academics, experts), ‘public role models’ and ‘antagonists’. These roles are similar to the roles of opinion leaders, change agents and early adopters from Rogers’ DOI. Griffiths et al stated that the similarities between the conditions and roles in Johnston’s innovation theory and Rogers’ DOI are ‘noteworthy’ and consequently Rogers’ theory may ‘provide a practical basis for assessing fluctuations in drug use’ (2000: 835). In the study by Soussan et al (2018), there was a focus on risk and human reasons for drug use. For example, there was reference to the Self Determination Theory (SDT) in application to NPS use which suggests that individuals engage in NPS ‘for the rewards inherent in the activity itself... which are signs of intrinsically motivated persons’ (Ryan and Deci, 2000).

Market

It is necessary to highlight how the NPS market contrasts with the more traditional illegal market and whether this has implications in the internal and external reasons for NPS diffusion. Additionally, assessing the characteristics of the NPS market can help determine which NPS user group may be most at risk of harm.

NPS are sold through street headshops (although this is no longer the case in the UK, following the PS Act), the internet (both clear and darknet), the underground market and through social supply of friends or acquaintances. The growth of the online market has been described as providing ‘new opportunities’ for the supply and purchase of drugs (EMCDDA, 2011; Sutherland et al, 2017: 2). Additionally, Aldridge and Décary-Héту (2016: 12) stated that cryptomarkets in particular offer a ‘completely new distribution channel for illicit drugs’. Although there has been an increase in awareness of online markets and cryptomarkets (Sutherland et al, 2017), Van Hout and Hearne (2017) stated that NPS sales are still limited through the darknet. In the EMCDDA and Europol

(2017) study it was found that NPS were less commonly sold on the darknet market than traditional illegal drugs and this was seen to reflect the significant impact of the clearnet market on NPS sales (Van Buskirk et al, 2017a; Van Hout and Hearne, 2017). The marketing of NPS was described as ‘aggressive’ by Corazza et al (2014b: 228) who suggested that the marketing by online retailers deliberately attracted customers who were misled by the advertising of ‘legal and safer alternatives’. Names of products are designed to attract a younger age group (Corazza et al, 2014b).

Different user groups prioritise different purchasing outlets, for example in the study by O’Brien et al (2014) which involved cyber-psychonauts, their preferred method of purchase was through the internet. In contrast, in the study by Fletcher et al (2016), shops were more important for the NPS users surveyed. Additionally, in the study by Sutherland et al (2017) in Australia, among regular psychostimulant users, the online market was not viewed as an important NPS purchasing outlet with social supply existing as the most common form of supply. In addition to variations among user groups as to purchasing patterns, Sutherland et al (2017) highlighted the variations in purchasing patterns of different NPS. For example, SCRA were more frequently purchased through headshops (McElrath and O’Neill, 2011), but in contrast mephedrone was most frequently obtained through friends (Barratt et al, 2013; Sutherland et al, 2017). Sutherland et al (2017) suggested however, that these disparities may be the result of different methodologies or geography used in the different studies.

Users

One of the research questions involved in this thesis addresses the different categories of NPS users and who may be the most at risk from harm. Therefore, it is necessary to review the literature in terms of who are identified as NPS users and if the populations are well defined. In addition to assessing whether NPS users are distinct from users of traditional illegal drugs. It should be noted that NPS users are studied in greater depth in Study One.

The groups of NPS users are addressed frequently in the literature. They include psychonauts (Soussan et al, 2018), experimenters and individuals evading drug detection (Bilgri, 2016; Soussan and Kjellgren, 2016). Psychonauts are defined as individuals who are ‘actively interested in seeking new psychoactive experiences’ (Chatwin et al, 2017: 2). This variation in user groups from first-time drug users to experienced psychonauts creates challenges for drug policymakers (Nekola and Moravek, 2015). NPS users are described as being aged between 18 and 30 (Werse and Morgenstern, 2012; Wagner et al, 2014; Orsolini et al, 2015; Van Hout and Hearne, 2017) and use is more common among males than females (Vardakou et al, 2011; Bonar et al, 2014; Palamar et al, 2015; Nolan et al, 2016). NPS use affects ‘practically all social categories’ irrespective of socioeconomic status,

education or age (Nekola and Moravek, 2015: 229) and older individuals, including middle-aged NPS users, need to be acknowledged as users (Barratt et al, 2013; National Assembly for Wales Health and Social Care Committee, 2015; Soussan and Kjellgren, 2016).

The use of NPS by pre-existing drug users is acknowledged in the literature (Wagner et al, 2014; Burns et al, 2014b; Loeffler et al, 2016). Fernández-Calderón et al (2018) suggested that between 83% and 99% of NPS users also use traditional illegal drugs. Other populations associated with NPS use include the American military and SCRA, (Stogner and Miller, 2014; Weaver et al, 2015) students and synthetic cathinones (Van Hout, 2014), MSM (men who have sex with men) and synthetic cathinones (Pirona et al, 2017) and individuals engaging in the night-time economy (Sutherland et al, 2016). Vulnerable NPS user groups include the prison population and those who have recently left prison, the homeless population and individuals with mental health issues (Chatwin et al, 2017). Atkinson et al (2016) also recognised certain user groups who are at greater risk from NPS use and harms as young people, MSM groups, people in custodial settings and injecting drug users. A ‘large proportion’ of research on NPS users had focused on mephedrone (Stephenson and Richardson, 2014), but there has been an increase in research surrounding SCRA users, especially in prisons (Ralphs et al, 2016). In their study, which explored the use of SCRA among young adults, Blackman and Bradley (2016) stated that there has been a change in the profile of NPS users from young adults experimenting to the problematic use of SCRA by vulnerable and prison populations.

Although broad user groups have been identified, there is limited literature on the demographic profile of the user groups (Sutherland et al, 2016; Lamy et al, 2017; Vreeker et al, 2017). Overall, NPS users are a heterogeneous group and the diversity of populations using NPS has been highlighted in the literature (Sande, 2015; EMCDDA, 2016a; Karila et al, 2016; Sutherland et al, 2016; Kassai et al, 2017b).

Critique of the UK Psychoactive Substances Act

The background to the introduction and the composition of the PS Act has been explored in the introduction chapter however, it is important to briefly explore the perceptions of the Act, in order to place the findings from the succeeding four research studies in context.

The ACMD (2015) stated that there were aspects of the Act which they supported including the ‘pro-active’ approach to addressing the NPS problem and this may avoid the time-delays experienced with the previous legislation. Haden et al (2017) stated that the Act was attractive due to its simplicity in contrast to the reactive nature of previous legislation. Reuter and Pardo (2017) also highlighted the potential to reduce the number of NPS introduced resulting in a lowering of risk of harm. The lack

of a possession offence in the Act was praised by Stevens et al (2015) because of the uncertainty on whether criminalisation of possession reduces harm or use levels.

The Act however, has also been extensively criticised. Reuter and Pardo (2017: 2) explained that there has been a 'notable lack of support' from 'any part of the expert community'. The Act has been criticised for its definition of psychoactivity and the challenges associated with this definition, the failure to distinguish between substances with varying levels of harm and the potential displacement to the underground drugs market. Kavanagh and Power (2014) and the ACMD (2015) also highlighted the limitations of the implementation of a blanket ban in supporting academic research. The key criticism of the Act has been the definition of psychoactivity which is described as 'overly broad and confusing without having established any mechanism to measure it' (Reuter and Pardo, 2017: 5). The simple focus on psychoactivity is described as 'problematic' and there will be an unknowable number of substances which fit the definition but are not included in the list of exempt substances (Stevens et al, 2015: 1167). Stevens et al (2015: 1167) described the Act as having 'deep problems in its legal and scientific bases'. Furthermore, this will be problematic for prosecutions. The House of Commons Home Affairs Committee (2015) stated that they had been informed by Release and Transform that Irish authorities had difficulties in proving psychoactivity.

Reuter and Pardo (2017) criticised the Act for not distinguishing between high and low-harm NPS in terms of punishment. The rationale for this decision related to the complications which arise from deliberation of the concept of harm (Stevens et al, 2015). One of the objectives of the Act is to 'protect hard-working citizens from the risks posed by untested, unknown and potential harmful drugs' (House of Commons Home Affairs Committee, 2015), however the Act does not feature the concept of harm, instead the focus has been on psychoactivity which has been criticised. This focus may mean that there are substances which are prohibited because they are psychoactive but not harmful. Barratt et al (2017) highlighted that grouping NPS as a single category is problematic in terms of harms as all substances are assigned the same level of harm in relation to policy. Additionally, the use of the term 'hard-working citizens' suggests a focus on certain populations whilst excluding other populations, for example homeless individuals.

Although the Act may lead to the reduction in the availability and use of NPS, there may be the consequence of displacement of use to other more harmful substances (Stevens et al, 2015). Stevens and Measham (2014) acknowledged the decision to prohibit a substance which has unknown harms but they stated that the prohibition of a NPS may also lead to the known harms associated with prohibition. Prohibiting an NPS may move the market to another substance of which users and researchers have little or no knowledge (Barratt et al, 2017).

In the study undertaken by Fletcher et al (2016) which took place before the introduction of the PS Act, there was a strong preference for headshops to be banned. This was a view also held by individuals who took NPS, who stated that their ban would remove temptation (Fletcher et al, 2016). Stevens et al (2015) however questioned whether the closure of headshops would lead to the reduction of harm. They explained that in a study conducted by Linnell et al (2015) in Blackburn, when the local authority closed the headshops, individuals continued to purchase NPS from retail outlets outside of Blackburn or through the underground market. A number of headshops would operate safer retail practices such as not selling NPS to underage individuals and not offering promotions on products (Stevens et al, 2015). Stevens et al (2015) also emphasised the potential problematic consequences of the merging of the NPS market and the traditional illegal drugs market both online and the underground market, which will affect the most vulnerable user groups. Blackman and Bradley (2016) similarly suggested that their research has shown that NPS have been moving to the illicit market. Although following the closure of headshops in Ireland, the market did not move online, the ACMD stated that this may still be a possibility following the introduction of the Act in the UK (House of Commons Home Affairs Committee, 2015).

Diffusion

In exploring the diffusion of NPS, it is necessary to explore how and whether the literature does address the diffusion of NPS. The concept of diffusion is addressed directly and indirectly in the literature in reference to the transience of the NPS market. Many NPS products disappear after only a short time on the market due to external factors including changes in legal status and market trends (Kapka-Skrzypczak, 2011). If a drug successfully diffuses into the population then this is likely to eliminate the majority of other similar substances from the market (Reuter and Pardo, 2017). The majority of newly detected substances are chemical variants of existing substances with similar effects and therefore diffusion would have a large impact (The New Psychoactive Substances Review Expert Panel, 2014; Stephenson and Richardson, 2014).

Evans-Brown and Sedefov (2017: 1) explained that the majority of new substances created by manufacturers are 'disposable' and they are manufacturing substances to mimic the effects of traditional illegal drugs that can be produced, transported and sold freely and easily. The transience of the NPS market is highlighted in many NPS only being available for a short period of time (Matthews et al, 2017). The majority of NPS have been described as 'hardly register[ing] on the radar' (Chatwin et al, 2017: 1) and as 'modest and localized' (Reuter, 2011: 4). The appearance of MDPV and methylone, although pharmacologically similar to mephedrone, were described as not having a 'pervasive or lasting presence' (Matthews et al, 2017). The majority of new drugs that

appear on the market do not spread beyond a small group of users (EMCDDA and Europol, 2013); Van Amsterdam et al stated that 98% of NPS are ‘little more than one night wonders’ (2013: 317).

Whether a drug will diffuse successfully or not is acknowledged in the literature. Evans-Brown and Sedefov (2017) highlighted that this is also the case in the traditional illegal drugs market as only a small number of drugs become popular. General drug trends (prevalence and preferences) change over time, and fluctuate in response to wider social, political and cultural factors in society (Kelly, 2011). NPS market dynamics are influenced by similar factors: effects, price, availability, legality, purity and competition (Smith and Garlich, 2013). Smith and Garlich (2013: 70) explained that these are the factors which affect the ‘life cycle stage’ of an NPS product: ‘introduction, growth, maturity and/or decline’.

Matthews et al (2017: 47) suggested that the positive and negative perceptions of substances are the best predictors of which substances will transition from ‘niche to generalised products’ although this would also be dependent on co-availability of alternative substances. This can be applied to a consumer-led perspective on drug use in the manner that consumer satisfaction or dissatisfaction is a key factor in the reason for a product spreading through a population or not (Bruneel et al, 2014).

Predicting the diffusion of NPS and the role they will play in the European drug market is challenging (EMCDDA and Europol, 2013). Nichols and Fantegrossi (2014: 577) explained that a new molecule may be discovered which gains ‘tremendous acceptance’ but identifying which one would be impossible to predict. Nevertheless, Stogner (2015) suggested that predicting the diffusion, prevalence and repeat use of a NPS should be done through comparison with the nearest traditional illegal analogue. For example, Stogner (2015) stated that the baseline projection for use by high school students of a newly identified hallucinogen with similarities to LSD could be based on recent estimates of LSD use from surveys such as the Monitoring the Future study. Beharry and Gibbons (2016: 32) suggested considering previous or abandoned ‘drug candidates’ to predict emerging NPS.

Scoping the NPS literature

Chatwin et al (2017) stated that there is a lack of research evidence involving new drugs. They stated that there is ‘only a relatively small number’ of studies which focus on user experiences and motivations for NPS use (for example McElrath and O’Neill, 2011; Van Hout and Brennan, 2011; Measham et al, 2011; Perrone et al, 2013; Lauritsen and Rosenberg, 2016; Measham and Newcombe, 2016) in contrast to prevalence estimates. Additionally, there are a limited number of NPS policy analyses (Winstock and Ramsey, 2010; Hughes and Winstock, 2011; Kavanagh and Power, 2014; Stevens et al, 2015; Rychert and Wilkins, 2016; Walsh, 2016). Chatwin et al (2017: 3) recognised this and emphasised the importance of research which aims to:

'evaluate policies and their consequences, critically assess official discourses, evaluate supply and demand, particularly within online markets, and explore the needs and experiences of users'.

Chatwin et al (2017: 3) stated that there is an urgent need for more information about new drugs including NPS as without a solid evidence base for both policymakers and practitioners no 'meaningful progress' can be made in addressing NPS as an issue in relation to both use and harms.

There has been an increasing number of epidemiological publications focused on the toxicity, harms and use patterns of NPS (Atkinson et al, 2016) and the identification and characterisation of NPS (Giné et al, 2014). The majority of literature regarding NPS use is derived from a clinical context such as case studies or hospital admissions data (Palamar et al, 2015; Loeffler et al, 2016; Kassai et al, 2017a; Lamy et al, 2017). The difficulties of the use of case studies to identify side effects associated with use of specific NPS are that the side effects reported may only apply to the particular case study and not on a population level due to confounding factors (Fletcher et al, 2016; Karila et al, 2016). Therefore, they do not reveal information on prevalence or diffusion of different drugs.

Motivations for NPS use

The understanding of UK NPS use and the motivations for use is mainly generated from general household population surveys or specific groups such as young people or clubbers and this has 'skewed' the data regarding prevalence, motivations and harms (Ralphs et al, 2016). Additionally, Soussan and Kjellgren (2016) stated that knowledge in this area is contradictory and this is amplified by the challenges in drawing comparisons between studies owing to different populations and different substances. Ralphs et al (2016) highlighted the limitations of the focus on specific populations and the manner in which these surveys are conducted, through online methods or general population surveys, as this excludes populations who are likely to be using NPS more problematically such as the prison or the homeless populations. Excluding these populations from research concerning motivations for NPS use is problematic as motivations of these groups are likely to differ from other populations. Even among populations with higher drug use such as students, there is still relatively little known about the use of NPS (Egan et al, 2015).

There have been studies which have explored the motivations for NPS use both nationally and internationally. Loeffler (2016) identified six surveys which examined motivations for SCRA use and the sample sizes ranged from 42 to 860. Soussan and Kjellgren (2016) used a questionnaire to explore the characteristics, attitudes and motivations of NPS users. The questionnaire involved demographic questions and a visual analogue scale (VAS) where participants ranked the importance

of different motivations. This research contrasted with that of Soussan and Kjellgren (2016) however, in that the participants did not need to be NPS users and furthermore, the views of the drug users were compared to the views of both the NPS retailers and drug professionals with regard to why a NPS product may diffuse. Similarly, the study by Sutherland et al (2017) involved exploring the motivations for NPS use among current drug users through interviews which incorporated a similar scale to rank the importance of different motivations. This research also examined the differences in motivations between different substances. However, again there is a sole focus on the perceptions of the *users* surrounding motivations for NPS use. This is similarly the case for Barnard et al (2017) examining NPS use motivations in the UK and Wersé and Morgenstern (2012) in Germany. The use of online forums to explore NPS use motivations has been praised in the literature (Soussan and Kjellgren, 2014) and this was the method used by Bilgri (2016) in addition to interviews. This method allowed for greater detail surrounding motivations for use, however the interviews only included male SCRA using participants and the focus was on SCRA and therefore may not be generalisable to other NPS or different user groups such as females.

In Poland, Dabrowska and Bujalski (2013) incorporated a range of viewpoints in their study of NPS which involved the qualitative analysis of newspaper articles. This research included the perceptions of NPS retailers, users and experts in the area of NPS. However, the focus of the research was not on the perceptions of why an NPS may diffuse but instead on how the issue of NPS had been framed in the Polish media. Nevertheless, the study is noticeable for its inclusion of similar stakeholders, as to this research, which is scarce in the literature. The work by Measham and Newcombe (2016) is a key publication which examines the motivations for NPS use, the challenges associated with defining NPS and the different NPS user groups. Additionally, Stogner (2015) explored how to efficiently forecast the successful diffusion of an NPS which incorporates similar processes as the application of the DOI to the diffusion of NPS through a literature review and reviewing case reports. Griffiths et al (2000) explored drug trends from a theoretical perspective including the application of the DOI to the diffusion of drugs, to which they suggested the use of DOI to help examine how new patterns of drug use develop. This theoretical framework however, is not used to conduct research with different NPS stakeholders. In addition, Ferrence (2001) explored the applicability of the DOI to drug use, however the timing of this work took place before the technological changes which have taken place and the implications they have had on the NPS issue. Similarly, the work by Ferrence (2001) did not include research with stakeholders to determine their perceptions for their diffusion of drugs.

Motivations for NPS use identified in the literature

The most common motivations identified and discussed relating to NPS use are legality, the availability or quality of traditional illegal drugs, both positive and negative effects, availability or price and value for money and friend recommendation.

Sutherland et al (2017) critiqued the study by Soussan and Kjellgren (2016) suggesting that there was too much focus on intrinsic factors such as pleasure or self-exploration as motivations for NPS use. They suggested that external factors such as price and legal status also needed to be included. This was because of the high proportion of NPS users who also used traditional illegal drugs and motivations for use are likely to overlap with NPS use. Sutherland et al (2017: 24) also suggested that examining external motivations are 'more amenable to change through policy and treatment'.

Measham and Newcombe (2016) suggested that an external factor such as legislative control affects the purity, availability, price and the attractiveness for some user groups; however, for other groups, use may be resistant to the factors. Stogner (2015: 1) attributed five steps to forecasting the success of an NPS: 'the availability of a potential user base, the costs – legal and otherwise – of the drug relative to existent analogues, the subjective experience, the substance's dependence potential and that of any existent analogue, and ease of acquisition'. In the study by Barnard et al (2017), respondents were asked to identify and describe what their favourite NPS would be through a qualitative questionnaire. The reasons given for their favourite NPS related to the availability of traditional illegal substances, legal status and ease of availability but predominantly the most important motivation was the effects of the substance, both positive and negative.

Soussan et al (2018) found that participants used NPS for nine reasons, these included: the ability to use the substances in a safer and more convenient manner, satisfying a curiosity and interest in their effects, facilitating a novel and exciting adventure, use as coping agents, fostering social bonding and belonging and finally problematic and unintentional use. The area of motivation includes general human motivation models but also specifically drug use theories (Soussan et al, 2018). Soussan et al (2018) highlighted literature focusing on motivation for drug use which included reasons such as pleasure, enhancement, coping, habit, addiction and self-exploration (e.g. Boys et al, 2001; Nicholson et al, 2002). However, they highlighted that studies exploring NPS motivation emphasise external circumstances such as price, legality and purity but there is a general view that individuals using NPS will do so when traditional illegal drugs are prohibited or reduced in supply in other ways (Measham et al, 2010; Soussan et al, 2018).

In the study by Soussan and Kjellgren (2016) there was more of a focus on well-being, nevertheless in general the main incentive for NPS use was for pleasure and enjoyment. Soussan and Kjellgren (2016) however emphasised that there were differences in the preference of different substances

among the different user groups including disparity between the motivations for use of hallucinogen and opioids. In the study by Sutherland et al (2017), in general the leading motivation for NPS use was value for money, however again the reasons for use varied between substances: availability was the leading motivation for synthetic cathinone use and perceived legality and availability were the leading motivations for SCRA use. The study also included Dimethyltryptamine (DMT); but this was not included as an NPS in the definition used in this thesis. In the study by Kassai et al (2017a: 3) who emphasised the ‘increasing body of [SCRA] research’ on motivations and effects of use, motivations for use included lack of detection in drug tests and price. In the study by Werse and Morgenstern (2012), ten motivations for NPS use were provided and the motivations with the highest approval rates were ‘getting high’ and ‘curiosity’ which were similar to the motivations for the use of traditional illegal drugs. Similarly, there were differences between the motivations for use of different substances.

Importance of the thesis

Understanding the emergence and prevalence of the NPS market on a global scale is important but it is also important to explore motivations for NPS use on a smaller scale. There is a limited amount of literature available on the motivations of NPS use and this is accentuated by the variety of different user groups and the variety in NPS. This is also amplified by the lack of clinical trials for new NPS and subsequent difficulties created in assessing their toxicity and harms (Andersson and Kjellgren, 2016). Therefore, additional research examining NPS motivations, including the disparity between groups, is identified as being important (Kjellgren and Jonsson, 2013; Moore et al, 2013; Egan et al, 2015; Andersson and Kjellgren, 2016; Soussan and Kjellgren, 2016; Barnard et al, 2017; Sutherland et al, 2017). Stephenson and Richardson (2014) also emphasised the importance of examining and understanding the patterns of use of drugs within the market and the reasons for transition between different patterns of use.

Van Hout (2014: 273) explained that the ‘diffusion of [NPS] remains of interest to policymakers, clinicians, and scientists given the potential for ill-informed use and harm’. The importance of understanding the different motivations for NPS use, including the use in different groups, is highlighted by Soussan and Kjellgren (2016). They stated that understanding these motivations could help implement more effective prevention which may lead to harm reduction. Furthermore, understanding motivations and what is affecting changes in the NPS market may help in identifying appropriate drug policies to reduce harm (Andersson and Kjellgren, 2016; Reuter and Pardo, 2017). The importance of avoiding addressing the motivations of NPS use from a ‘broad and all-encompassing perspective’ is emphasised and therefore a ‘more nuanced understanding of the different pathways to drug use’ is likely to be more effective (Soussan and Kjellgren, 2016: 78). This

is important for identifying the specific reasons for NPS use which can be obtained from examining different groups, in addition to the more general reasons for NPS use.

Understanding motivations for NPS use may help in predicting the diffusion of NPS onto the recreational drug market (Sutherland et al, 2017). Sutherland et al (2017) highlighted the differences in perceived relative advantages as affecting the potential longevity of an NPS product. For example, legality and availability are unlikely to be long-term advantages but in contrast, perceived superiority over a traditional illegal drug or personal preference may help a product have sustained popularity. Soussan and Kjellgren (2016) suggested that their study had limitations in the manner that the eight items used to understand the motivation for NPS use, which were abstracted from the drugs literature, may have restricted the options and other motivations could not be identified. Therefore, they stated that further research should incorporate qualitative and inductive methods of analysis to obtain potential motivations which extend beyond the preconceived ideas.

Soussan et al (2018) explained that obtaining a greater understanding of motivations surrounding drug use should help improve prevention interventions and consequently a reduction in drug-related harms. Soussan et al (2018) used the example of health promotion campaigns failing to acknowledge the 'pleasure incentive' as a motivation for drug use. Gaining a sophisticated understanding of specific reasons for drug use should help in the ability to adapt harm reduction messages for the different user groups (Boys et al, 2001; Sutherland et al, 2017). Bonar et al (2014) also highlighted the importance of clarifying the relative importance of each NPS motivation as this could have influence on the planning of treatment.

Conclusion

This literature review has aimed to provide an exploration of the NPS issue, both in the UK and globally, and the challenges which have arisen following their emergence. The review has also aimed to provide the context in which this thesis was conducted and address the gaps that have emerged through this literature review.

Chapter 3: Methodology

Introduction

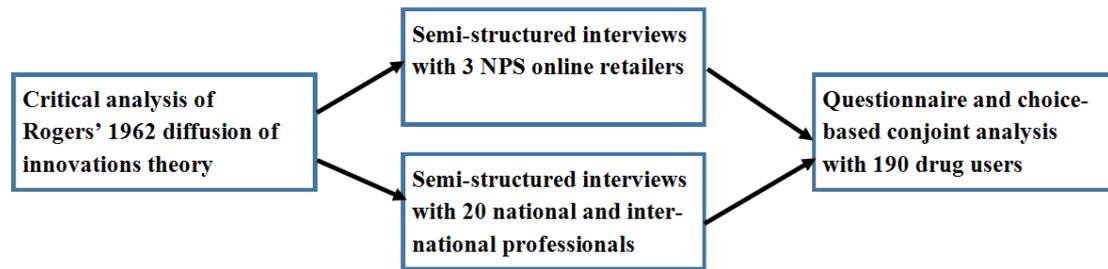
The principal aim of this PhD research was to explore the diffusion of NPS in the UK. To address this aim, a mixed methods approach was taken involving:

- a critical analysis of Rogers' Diffusion of Innovations theory (Study One)
- interviews with NPS retailers (Study Two)
- interviews with professionals (Study Three)
- a choice-based conjoint analysis study of hypothetical NPS purchases (Study Four).

A mixed methods approach was deemed the most appropriate method to answer these research questions. The goal of mixed methods research is to draw the strengths from qualitative and quantitative methods and minimise their respective weaknesses (Burke-Johnson and Onwuegbuzie, 2004). Additionally, a mixed methods approach is used to improve the generalisability of research findings (Burke-Johnson and Onwuegbuzie, 2004). In healthcare, mixed methods research can offer 'powerful tools for investigating complex processes and systems' (Fetters et al, 2013: 2140).

The order in which the methods were implemented is noteworthy and as noted by Burke-Johnson and Onwuegbuzie (2004) whether the phases are carried out sequentially or concurrently is an important element of mixed methods research. For this research, an exploratory sequential design was undertaken: the research studies were carried out in a discrete process and each with a different population. The findings from the critical analysis (Study One) helped inform the qualitative studies (Studies Two and Three) and all these studies helped inform and plan the quantitative study (Study Four). Having interviewed NPS retailers and professionals and obtained data on the perspectives of these two groups, it was necessary to complete the research by conducting research with drug users to contrast the findings between the different groups. This form of integration is described as 'building' (Fetters et al, 2013). The use of qualitative research in Studies Two and Three allowed for discovery and exploration which are key characteristics of qualitative research. Study Four, the final study, included the use of a quantitative methodology which allowed for deduction and explanation. During the discussion, 'integration through narrative' which involved the 'weaving approach' (Fetters et al, 2013) was undertaken. This involved writing both quantitative and qualitative findings simultaneously on a theme-by-theme basis (Fetters et al, 2013). This approach was appropriate in relation to public health, especially the involvement of stakeholders but also the theoretical basis of the PhD.

Figure 1: The research process



This chapter focuses on the research methods employed as part of this mixed methods PhD. The chapter will begin by examining the research paradigm of the researcher. The chapter will then explore each research method in the order in which it was implemented during the PhD research beginning with the critical analysis, followed by both sets of interviews: the retailer interviews and professional interviews, and finally the questionnaire and CBC.

It should be noted that the strengths and limitations of each study are explored in each respective study chapter (Chapters 4-7).

Epistemological and ontological position

This research was conducted from a pragmatic perspective. Pragmatism is not committed to any single philosophy or paradigm (Bloomberg and Volpe, 2016), however research is conducted according to the methods deemed the most appropriate by the researcher. A key consideration in conducting the research through this paradigm was the research purpose of using a combination of both quantitative and qualitative research methods to understand the research problem. Pragmatism was also an appropriate position, as these were exploratory studies. Krathwohl (1998) explained that researchers should choose the research methods which best fit their research purposes and questions. Subsequently pragmatists, in particular, often use a mixed methods approach. The use of mixed methods allows for the structure of a quantitative approach and the flexibility of a qualitative approach (Bloomberg and Volpe, 2016). Bloomberg and Volpe (2016) explained that, in contrast to paradigms such as post-positivism where knowledge claims arise from antecedent conditions, for pragmatism, knowledge claims arise from situations and actions; research is contextually based. Pragmatists believe that reality is constantly debated and interpreted. Burke Johnson and Onwuegbuzie explained that when conducting mixed methods approaches, it is necessary to adopt a paradigm and philosophy that will ‘attempt to fit together the insights provided by qualitative and quantitative research into a workable solution’ (2004: 16). Furthermore, thematic analysis of the qualitative data was used. Thematic analysis does not belong to any pre-existing theoretical framework, and therefore it offers flexibility to be used in different theoretical frameworks (Braun and Clarke, 2006), in this case pragmatism. Although it can be applied to any framework, for example social constructionist thematic analysis.

Study One: A Critical Analysis of Rogers' Diffusion of Innovations Theory

Aim of Study

The aim of Study One was to analyse Everett Rogers' DOI (see Chapter 2 for a description of the theory) and critically analyse its applicability to the diffusion of NPS.

The critical analysis was a necessary first study in this PhD in order to assess whether Rogers' theory was useful for understanding diffusion of NPS. The critical analysis subsequently informed the interview guide for the two interview-based studies and the selection of attributes for the CBC.

Methods

In order to achieve the aim of this study a critical analysis of the applicability of DOI to NPS was undertaken. This involved four stages.

Stage One

The first stage involved a comprehensive, but non-systematic, literature search on Rogers' DOI theory. The term *diffusion of innovations* was used to search in the databases Science Direct and PubMed. Search results were inspected for relevance and selected articles reviewed. The inclusion criterion was peer-reviewed papers published in the English language since 2000. Articles included needed to include Rogers' DOI theory as the main theory. Alternative diffusion theories which had been applied were not analysed. Literature was drawn from many different fields such as social marketing (e.g. Sundstrom, 2014), technology (e.g. Barrette, 2015) and health communication (e.g. Crook et al, 2015). However, only a small number of articles applied DOI to controlled drugs (Golub and Johnson, 1996; Ferrence, 2001; Arfken et al, 2014; Furst, 2014). Included literature utilised a range of different research methods such as questionnaires (Arfken et al, 2014), literature reviews (Greve, 2011) and interviews (Sundstrom, 2014). Most articles provided a literature review of the applicability of Rogers' theory to the diffusion of their chosen topic. Additionally, a large proportion of the articles had used the DOI theory in understanding a newly introduced innovation (Heri and Mosler, 2008).

In total, 191 articles were reviewed and key features of the theory were abstracted. The findings were then extracted to create a table comprising the different features of Rogers' DOI theory (see Appendix 1).

Stage Two

Key elements of DOI theory were identified (e.g. relative advantage) and tabulated. For each element, a list of examples and evidence that supported it, drawing on NPS and other drug literature knowledge and wider drug knowledge, was included. This formed the stage of the study creating the framework in which the DOI theory could be applied to NPS.

Stage Three

Science Direct and PubMed were searched using the search terms: *new psychoactive substances*, *novel psychoactive substances*, *legal highs* and *bath salts*. Inclusion criterion was peer reviewed English language studies. Only articles published after 2010 were included because of the recent emergence of the NPS market. Literature searches on the websites of key organisations such as the EMCDDA, the UNODC, and the UK Home Office were also conducted. The articles were reviewed to assess whether they included aspects of Rogers' theory. For example, for relative advantage, articles were assessed to determine whether they addressed issues of price or legal status. If an article did not address an element of the DOI theory, it was not included. Articles included needed to be relevant to the topic and peer reviewed. In total, 233 articles were reviewed. The key aspects were then extracted and reviewed in accordance with the tables created in stages one and two.

Stage Four

The DOI theory was then critically analysed as a theory for describing the diffusion of NPS. This study was completed prior to the PS Act being introduced in May 2016. Therefore it was revisited following the implementation of the Act to ensure that it was still appropriate as a theory. This involved the changes such as legal status and accessibility which can be seen as relative advantages in the DOI theory and which were affected by the introduction of the PS Act.

Study Two: Interviews with NPS Retailers

Aim of Study

Interviews with NPS retailers formed the second stage of the research with the aim of determining what mediating and moderating factors were important for the diffusion of NPS. This allowed the voice of these stakeholders to emerge as they have been frequently missing from discussions of NPS policy.

Design

For the purpose of this research, retailers were defined as online clearnet retailers selling NPS directly to consumers, in contrast to ‘bricks and mortar’ retailers (e.g. headshops), cryptomarket vendors, or ‘street dealers’.

Recruitment

Originally, interviews with retailers were to follow the interviews with the professionals. However, due to the PS Act introduction in May 2016, it was decided to begin recruitment and interviews for this study alongside the recruitment of professionals. The number of participants was decided based on data on the number of UK web shops selling NPS. The inclusion criteria were relatively broad because of difficulties in access but was limited to online NPS retailers. The sample was selected originally through purposive sampling. A purposive sample frame was constructed through a search of online retailers included in a database constructed during a previous pan EU project led by one of the supervisors (Brunt et al, 2017).

Recruiting NPS retailers was a difficult process. The sampling method soon became convenience sampling as websites closed down before the introduction of the Act and retailers became hesitant to respond to request for participation. Contact with interviewees needed to be established before the introduction of the Act, which limited the time frame for recruitment.

Recruitment took place through invitations sent to contact email addresses provided on websites. The recruitment rate was very poor in comparison with that of the professionals and although over forty recruitment emails were sent, thirty-five retailers did not respond. Additionally, once there was agreement from a retailer for an interview, completing the research was a lengthy process and this may have been because of the uncertainty surrounding the introduction of the Act. For example, the length of recruitment for one retailer took five months from initial established contact to the interview taking place.

Ethical approval was obtained for the recruitment of interviewees from Liverpool John Moores University (LJMU) Ethics Committee. The reference number was 15/EHC/101.

Methods

Three interviews took place between February and July 2016 and these were conducted by telephone and Skype. Questions were provided in advance in a Word document to one interviewee who requested to provide a written response. There was no time limit for the interviews and they lasted approximately an hour. All participants received a participant information sheet (see Appendix 2) and interviewees provided verbal or written consent.

The interviews were semi-structured. In contrast to the interviews with the professionals (Study Three), the retailers were all asked the same questions (see Appendix 2 for interview guide) as the same level of flexibility was not necessary as there was not the same variations in employment. Interview questions were open ended to allow for detailed explanations. Although the questions were informed by Study One, the interview schedule included an exploratory component and focused on the roles of the interviewees as NPS retailers. Similarly to the interviews with the professionals, questions also focused on perceptions of the reasons for the diffusion of different NPS and why they thought customers were buying different products. In terms of policy, the questions focused on the likely impact of the PS Act on diffusion of NPS, retailing practices and the drugs market in general.

Analysis

The thematic analysis of the interviews was conducted using NVivo. Thematic analysis is defined by Braun and Clarke as ‘a method for identifying, analysing and reporting patterns (themes) within data’ (2006: 79). Thematic analysis can provide a ‘flexible and useful research tool, which can potentially provide a rich and detailed, yet complex, account of data’ (Braun and Clarke, 2006: 78). Coding involved both deductive and inductive processes to allow flexibility to include new codes which emerged from the interviews. Deductive coding was undertaken using initial codes which had emerged from the critical analysis of Rogers’ DOI. Inductive coding was also used to allow flexibility to include new codes that emerged from the interviews that did not fit the theory.

The analysis was conducted in accordance with the recommendations of Braun and Clarke (2006). This involved becoming familiar with the data and generating initial codes. This was then repeated and then codes were collated into potential themes. Themes were then amalgamated and then finally the analysis was conducted.

Ethical considerations

The confidentiality issues faced during the interviews with professional individuals (see next section) were not experienced to the same level with the NPS retailers. This was owing to the individuals being described as 'NPS retailers' in contrast to the professional interviewees who were described in relation to their profession. Nevertheless, because of the nature of the work in which the individuals were engaged, it was equally as important to ensure confidentiality and anonymity were maintained throughout the research.

Ethical issues raised by the Ethics Committee included concerns surrounding privacy and confidentiality especially the topic area and practice of the interviewees. It was important to emphasise to the Committee that when the interviews were scheduled to take place the interviewees were speaking about their professional activities which, although a sensitive topic, were still a legal commercial activity. Because of the length of time taken to organise the final interview, the PS Act had been introduced in the UK, however the interviewee spoke about their business in the past when it was still a legal activity. Therefore, issues surrounding legal and moral responsibility were not as relevant.

Study Three: Interviews with Professionals

Aim of Study

Study Three aimed to determine what mediating and moderating factors were important for the diffusion of NPS from the perspectives of professionals. This research aimed to lead to a better understanding of policy impact and how NPS related health responses might be optimised.

Design

This study involved semi-structured interviews with both national (UK) and international professionals, representatives from UK government ministerial departments and executive agencies, police forces, government advisory groups, EU Agencies and UK universities. In total, twenty individuals were interviewed. The interviewees included a wide range of professionals, all of whom had knowledge or were working in the area of NPS. The specialist knowledge of NPS however, varied between individuals. For example, there was a contrast in knowledge between a representative from an organisation with a focus on NPS and a representative from an organisation with a broader focus on drugs more generally.

Recruitment

The decision to use interviews was that this method offered the most appropriate means of obtaining information regarding in-depth opinions and attitudes regarding the conceptualisation of NPS both as a problem and the importance of different NPS attributes among the professional interviewees. Interviews in policy environments offer ‘insights into events about which we know little’ because these activities take place ‘behind closed doors’ (Lilleker, 2003: 208). Additionally, interviews with policymakers ‘can provide immense amounts of information that could not be gleaned from official published documents or contemporary media accounts’ (Lilleker, 2003: 208).

The sampling method was purposive. This involved identification of relevant roles from the perspective of understanding, developing, and the delivery and monitoring of NPS policy. The original sampling frame included between fifteen and twenty participants and was limited to interviewing ‘policymakers’. However, as interviewees recommended other individuals to interview, the study was expanded to include other roles who had experience of NPS. The interviewees were originally planned to be limited to the UK but given that the PS Act was introduced during the planning of the work, it was decided to broaden the range of interviewees to include other countries. These interviewees were chosen intentionally to include countries where similar legislation had been

introduced, for example Ireland, Poland and Australia or where NPS use was a recognised problem, for example the USA. In total, twenty-six individuals were invited to participate in the research by email, but six did not take part.

Ethical approval was obtained for the recruitment and interviews of participants from LJMU Ethics Committee in January 2016. The reference number was 15/EHC/095.

Methods

The interviews took place over a five-month period between March and August 2016. Interview platforms included telephone, Skype and face-to-face interviews. For one interviewee, the questions were sent in a Microsoft Word document at their request, and written responses provided. On average, the interviews lasted one hour (range 30-90 minutes). All participants received a participant information sheet (see Appendix 3) and if interviewed on the telephone or through Skype, gave their verbal consent. Interviewees who were interviewed in person signed a consent form.

The interviews were semi-structured to allow for exploration and flexibility; this form of interview was appropriate because of the wide range of professions of the interviewees. Additionally, in accordance with the criteria of semi-structured interviews the questions were open ended to allow for detailed explanations. There was no time limit for the interviews. The interview guide (see Appendix 3) was designed around appropriate themes identified as part of the critical analysis of the DOI and the implications of the PS Act for diffusion. The questions focused on perceptions of the reasons for the diffusion of different NPS and why people used NPS products. In terms of policy, questions focused on whether and how changes in drug policy, in particular the PS Act, and enforcement action were thought to affect the diffusion of different NPS.

Analysis

The initial categories of the conceptual framework for the analysis were deductively obtained from Rogers' DOI forming a theoretical thematic analysis. The same analysis procedure which was undertaken for the interviews with retailers (Study Two) was conducted using NVivo. The majority of Rogers' theory fitted appropriately with the data from the interviews, nevertheless new themes also emerged.

A criticism of theoretical thematic analysis is that it provides a less rich description of the data overall. This was addressed in this thesis through allowing the use of inductive coding during the data analysis. Braun and Clarke (2006) stated that thematic analysis is useful in producing qualitative

analyses which are suitable for informing policy development, which is an aim of this research. One of the main challenges which was faced during the analysis was the amount of data collected, both within individual interviews and across the twenty interviews. Braun and Clarke (2006) suggested that thematic analysis is one of the most effective forms of analysis to use for a large data set as it can be used to summarise the key aspects of the data set.

Ethical considerations

There were ethical considerations involved in conducting this set of interviews; the main issue was confidentiality. Lancaster (2017) highlighted that conducting interviews with professionals does not lead to the same issues of sensitivity which may be important when conducting research in other populations, for example the disclosure of illegal activity by drug users. However, the issue of sensitivity is still applicable with the 'personal, professional and political issues in play' (Lancaster, 2017: 101) which include potential job loss or the damaging of professional relationships. This in turn will affect how open the interviewees will be and their interview responses. Tilley and Woodthorpe explained that confidentiality extends beyond 'merely disguising the identities of research participants or sites' (2011: 198) and Lancaster (2017) emphasised that the act of anonymising data may not cover all aspects of confidentiality. An issue which Lancaster addressed was one which was frequently encountered during this analysis: that of 'balancing the faithful reporting of findings with potentially exposing respondents' identities' (2017: 98). This challenge is exacerbated by the small field in which research was conducted (Lancaster, 2017). In the case of this research, the area of NPS, although individuals may not be identifiable to lay members of the public, it may be the case that interviewees could be identified by other interviewees (Allmark et al, 2009). Individuals in the research area of NPS more generally may also be able to identify interviewed individuals. This was a concern in this analysis, as other individuals were likely to be aware of who a specific individual was based on their job title if made aware of their involvement in NPS policy. The commitment to anonymity and confidentiality in this research has meant exploring the significance of the professions of the interviewees been compromised. However, the research has still been able to contrast the perceptions of individuals in different professions.

Study Four: Choice-Based Conjoint Analysis of hypothetical NPS purchases

Aim of Study

The final study of the research was a questionnaire and a CBC conducted among drug users. This study aimed to extend the findings from the previous three studies by empirically examining the relative importance that drug users placed on particular elements of the DOI in making (hypothetical) choices about drugs. The Latent Class Analysis (LCA) also allowed for a statistical means of testing relationships and looking at the variability among drug users relating to drug choice.

Design

Conjoint analysis (CA) is a methodology used to assess and quantify consumer preferences for different products (Utz et al, 2014). The basis of CA is attributed to the field of psychology (Louviere et al, 2010), although it later became popular in market research. There has been a growing application of these methods in the health field to better understand healthcare and treatment choices. For example, to understand the choices made regarding disease-modifying drugs in multiple sclerosis therapy (Utz, 2014). The most common form of CA is CBC (Voleti et al, 2017). In contrast to other forms of CA where respondents rank or rate preferences through the use of a scale, in CBC, respondents express their preferences through choosing concepts from a range presented to them. For example, relevant attributes for a car may be price, number of seats, maximum speed, colour, cubic capacity and mileage.

Behavioural economic methods such as CBC have been used to examine the conditions that influence consumption of commodities (which may include illegal drugs), with a specific focus on cost, in terms of monetary value, effort necessary to obtain a commodity or the presence of existing goods (Bickel et al, 2007). There had been no previous work, to the best knowledge of the researcher, which had used CBC methods to understand illegal drug use choices. However, with respect to drug policy, Shanahan et al (2014) used a similar approach, a discrete choice experiment (DCE), to explore preferences for different cannabis policies in Australia. This was based on the variation in policy attributes including legal status, health harms avoided, criminal justice service costs, rates of cannabis use and purchase location.

The use of CBC can determine both the relative importance of the attribute as a whole (for example colour or mileage), but also which levels of each attribute are most preferred (by how much is a car with six seats preferable to a car with four seats). In this study, the product was a hypothetical NPS and participants were asked to rank the relative importance of five drug related attributes (drug category, accessibility, price (of drug experience for one episode), desired effects and side effects).

Attribute choice was exploratory, but was based on the findings of the previous three studies which suggested that these might be important in determining drug preferences.

The reason to use the CBC methodology was the benefit of presenting profiles in a way to participants that best resembled the process of choosing which NPS product to purchase. In comparison with alternative methods such as DCE, CBC was favourable because of its use in market research and the aim of this research in investigating motivations for the choice of different NPS as consumer products. NPS were therefore considered as consumer products affected by market forces in a similar (but not identical) way to other products in a market and considering the wide range of NPS available, CBC offered a good way to investigate this.

Recruitment

Due to the confidential nature of the study and the population being considered a hard to reach group, the sampling method employed was convenience sampling. Inclusion criteria were being aged between 18 and 35, UK residents and non-dependent drug users (e.g. self-declaring not currently receiving drug treatment). Participants also needed to have used any illegal drug in the previous five years. No incentives were offered for participation.

As this was an exploratory study and there was limited research which has modelled appropriate sample sizes for CBC it was decided, based on work in other domains, to recruit between 150 and 200 participants. For example, the sample sizes of Van Heek et al (2017) and Smith et al (2016) were 145 and 150 participants respectively. Conversely, the sample size of Scherer et al (2017) was 522 participants and the sample size of Meers et al (2017) was 50 participants.

Data was collected through a bespoke online questionnaire constructed using Lighthouse Studio CBC Module (Sawtooth Software) which is a specialist software package specifically designed for delivering CBC studies online. The survey was hosted on Sawtooth's dedicated secure software servers. Online circulation was the most cost-effective method of recruitment, in comparison to distributing paper questionnaires, and an effective way of reaching otherwise hidden groups. The study was advertised on UK based drug discussion internet forums that discuss NPS use including Bluelight, UK Chemical Research, Partyvibe, Ibiza Spotlight and Reddit. Social media including Facebook and Twitter were also used as a method of advertisement for the study. Furthermore, the questionnaire appeared on the Drugwise Daily mailing list, email services targeted at the drug and alcohol professional sector and the UK Psychedelic Society. The questionnaire was also distributed to undergraduate students at LJMU.

Ethical approval was obtained for the recruitment of participants from LJMU Ethics Committee in April 2017. The reference number was 17/PBH/005.

Methods

Questionnaire

In addition to the CBC component (below), the questionnaire included a number of sections which asked about:

- i) *Demographics*: age, gender, ethnic group and employment.
- ii) *Drug use history*: participants were asked to complete a table identifying which drugs they had used at least once and the frequency of this use.
- iii) *Questions relating to purchasing activities*: participants were asked from which outlets they purchased their drugs and also the ease of which they believed they would be able to purchase cannabis.
- iv) *Questions relating to influences on drug use purchase decisions*: participants were asked questions on harm-reduction practices and drug-information seeking behaviour.
- v) *Questions about information seeking behaviour*: participants were asked about the level of influence from the media, friendship networks and online forums.

The questions included in the questionnaire were designed to further investigate findings emerging from the previous three studies including the influence of communication channels such as friendship networks, the media and online forums on diffusion. Questions were also asked relating to purchasing activities to ascertain purchasing sources which would help in assessing the importance of accessibility and the impact of the PS Act. Demographic questions were included to obtain information about the sample in order to analyse and compare CBC data across different demographics.

The questionnaire was anonymous. To ensure confidentiality all submitted data was securely stored on the Sawtooth Software server and was only downloaded for analysis on a secure local PC. Participant information was included on the first page of the questionnaire and participants were asked to confirm consent through ticking a confirmation box on this page.

The questionnaire was first piloted among acquaintances of the researcher and feedback addressed. The completed pilot questionnaires were removed from the data set. As the likelihood of uncompleted questionnaires increase with a large number of open-ended questions (Andrews et al, 2003) with the

exception of one question, regarding which features of online forums were important, all questions were closed. The study took approximately fifteen minutes in total to complete.

CBC

Attributes

The CBC component of the questionnaire involved combinations of attributes presented to create hypothetical products with different attributes that participants ranked according to their personal preferences. The different attributes were:

- i) drug category (*Ecstasy-like drug, Hallucinogen-like drug and Cannabis-like drug*). The three categories were chosen as they were seen to represent varied drug categories.
- ii) accessibility (*Difficult to obtain, Moderately difficult to obtain, Moderately easy to obtain and Easy to obtain*)
- iii) price (of drug experience for one episode) (*£1-10 per dose, £11-20 per dose, £21-30 per dose, £31-40 per dose and £41+ per dose*)
- iv) desired effects (*Very low chance of desired effects, Moderate chance of desired effects and High chance of desired effects*)
- v) side effects (*Very low chance of unwanted side effects, Moderate chance of unwanted side effects and High chance of unwanted side effects*).

The identification and selection of attributes in CBC is the ‘most important step’ (Van Heek et al, 2017: 56). However, there are ‘serious disagreements’ in the literature relating to the number of attributes and attribute levels in a CA (Louviere et al, 2010: 16). The suggested maximum number of attributes to include in a CA study is six (Hair et al, 2010). This is to reduce the effort required from participants in completing the CBC tasks. Five attributes were used in this study. In order to identify appropriate attributes and attributes levels, the findings from the previous studies of the thesis were analysed, as there had not been other CBC investigations of drug use. Other attributes were considered, including whether a drug could be detected in a traditional drug test. This was not included however, as the groups likely to choose to use NPS for drug detection reasons were unlikely to be participating in this study.

For this study, a randomized CBC design was used, this is where attribute levels are presented to participants with equal probability (Sawtooth Software, 2013). A randomized CBC design is in contrast to a fixed orthogonal CBC design in which all participants are presented with a single version

of the questionnaire. Additionally, each level of each attribute was presented to the participants approximately an equal number of times.

Participants apply higher or lower importance on the different attributes and this helps them make a decision regarding which hypothetical product to purchase. This is the conceptual model of all CA:

‘it postulates that the utility of a multi-attributed item can be decomposed into specific contributions of each attribute and possibly their interactions’ (Rao and Suenkerud, 2013: 37).

CBC assesses to what extent each attribute contributes to the total utility of the product, in this case a hypothetical NPS. CBC measures the importance of each attribute as a whole and the part-worth utility of each attribute level. In CBC, higher utility scores reflect greater desirability at the attribute level and contribute to the overall influence of attribute options to a participant choosing the presented product. By completing this task a number of times with different combinations of hypothetical products with the same attributes but with different levels, it becomes possible to also measure the part-worth utility values. The part-worth utility values allow the researcher to:

‘calculate which level of an attribute contributed in which way to the overall preference for a specific [hypothetical product]’ (Mansour and Radford, 2016: 48).

At the start of the CBC component of the questionnaire, individuals were firstly asked to rank the importance of three different drug categories: hallucinogen-like drug, ecstasy-like drug and cannabis-like drug. This was only necessary for the ‘drug category’ attribute. This is because this attribute does not have a level preference order which can be applied to the other attributes. A level preference order rates between ‘worst’ to ‘best’ and can be applied to attributes such as price where the highest price can be viewed as the ‘worst’ and the lowest price as the ‘best’. However, this cannot be applied to drug categories as the researcher could not be aware as to which drug category could be viewed as the ‘best’ or the ‘worst’. This was the reason for the inclusion of a rating question for this attribute.

It is recommended that between eight and fifteen tasks are included in a CBC (Johnson and Orme, 1996) and therefore thirteen tasks were included in this CBC. Each task included four drugs with different attribute options (see Figure 2 for an example of a choice set). The text introducing the CBC stated:

*‘This part of the survey asks you to imagine three brand new drugs that have either i) ecstasy-like effects; ii) hallucinogen-like effects; or iii) cannabis-like effects. Read all the different attributes associated with these drugs and then select one of the choices. The attributes will change each time, so think carefully about how important things like accessibility, price, drug category, desired effects and side effects are to you. Remember that this survey is **confidential and anonymous**’.*

The decision was made to not include a ‘none of these’ option in order to incorporate a forced-choice response format. In order to avoid individuals choosing a product solely due to the drug category, in each question there were four options which ensured that in some cases the respondent had to choose between the same drug category and therefore had to assess the importance of other attributes. This overlap is beneficial as participants may have always chosen a certain attribute level and this approach allows for the same attribute level to appear twice in a choice task. Consequently, information regarding the trade-off between other attribute levels could be assessed (Meers et al, 2017).

Figure 2: Example of CBC question

If these were your **only options**, which would you choose?

4 / 13

Drug category	Hallucinogen-like drug	Ecstasy-like drug	Hallucinogen-like drug	Cannabis-like drug
Accessibility	Moderately easy to obtain	Difficult to obtain	Easy to obtain	Moderately difficult to obtain
Price (of drug experience for one episode)	£21-30 per dose	£31-40 per dose	£11-20 per dose	£1-10 per dose
Desired effects	Very low chance of desired effects	Very low chance of desired effects	Moderate chance of desired effects	High chance of desired effects
Side effects	Very low chance of unwanted side effects	Moderate chance of unwanted side effects	High chance of unwanted side effects	High chance of unwanted side effects
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

As can be seen in Figure 2, the concepts were displayed horizontally and the attributes were always displayed in the same order.

Analysis

The analysis of the questionnaire and CBC was conducted using SPSS 23 and the specialist CBC packages ‘Sawtooth Software Discover’ and ‘Sawtooth Software CBC HB’ (both Sawtooth Software). The data was downloaded from Sawtooth Software Discover into Microsoft Excel and checked for missing data. Participants who had not responded to taking an illegal drug were removed from the data.

LCA was conducted using Sawtooth Software Latent Class Module (v4.7; Sawtooth Software). The software algorithm identifies groups of participants who have similar preference profiles and estimates average part-worth utilities within each segment (Sawtooth Software, 2004). Each participant is assigned a probability (totalling zero) of Class membership for each of the identified segments. Using this approach, distinct classes of individuals can be identified that are similar to one

another with respect to the relationship between part-worth utilities, but different from individuals in other classes. In this way, participants can be assigned to a median Class for further analysis.

The CBC Latent Class module estimates multi-level Latent Class models by Maximum Likelihood Maximization of the likelihood function (Sawtooth Software, 2004). Class solutions were requested for two to ten Latent Classes with 15 replications. In order to determine the optimal class solution, the statistical measure of fit used was the Bayesian Information Criterion Index (BIC). Lower BIC numbers are interpreted as indicating better fitting models although, in addition, the final number of classes was determined by other factors. These included the average classification (posterior) probabilities (classification uncertainty assessed at the individual level (Tein et al, 2013)), class sizes (avoiding multiple Classes with few members), the research questions, parsimony, theoretical justification and substantive interpretability (Bauer and Curran, 2003). Once participants had been assigned to the different Classes, chi-square analysis, ANOVA and non-parametric tests were undertaken to identify significant differences in characteristics between the Classes. For all analyses, statistical significance was set at $p < 0.05$.

Ethical considerations

Ethical considerations when conducting research in the area of drugs includes ensuring anonymity and confidentiality. Appropriate practices ensuring these considerations were implemented in this research. These included emphasising anonymity throughout the completion of the questionnaire and CBC. Furthermore, participation was voluntary and individuals could withdraw at any time from the questionnaire before submission. Although the questionnaire and CBC involved hypothetical products, at the end of the questionnaire signposting to online resources for help were provided.

Chapter 4: Study One - A Critical Analysis of Rogers' Diffusion of Innovations Theory

Introduction

The DOI was developed by Everett Rogers in 1962 (Rogers, 1962). The theory describes the process of adopting new innovations. An innovation can be defined as an idea, practice or object that is perceived as new by an individual or other unit of adoption (Rogers, 2003). Rogers defined diffusion as the process 'through which an innovation is communicated through certain channels over time among the members of a social system' (2002: 990). Consequently, the DOI is characterised by four elements: the innovation itself, communication channels, time and the social system. Even when a new idea or innovation has advantages, getting this idea or innovation adopted is challenging and there is usually a lengthy time delay before it is widely adopted (Rogers, 2003). Diffusion exists as a special type of communication which focuses on information being exchanged and is concerned with new ideas (Rogers, 1983). The theory incorporates social roles, norms and networks to explain behaviour (Bertrand, 2004).

The original critical analysis was planned and took place before the UK PS Act was introduced. However, during the duration of the thesis this legislation relating to NPS changed. Although the law changed in the UK where a blanket ban was introduced, in other countries a blanket ban has not been implemented and therefore it was still necessary to explore the DOI in relation to NPS and legal status. There is a specific focus on legality as this is the most dramatic change following the introduction of the Act. Additionally, legality affects other factors including accessibility and possibly price.

This critical analysis will explore the applicability of the four components of Rogers' DOI to the diffusion of NPS.

The Innovation Itself

The first aspect of the DOI is the innovation itself. Even if the innovation was created a long time ago and is not ‘objectively’ new, if it is perceived as being new or a favourable attitude towards it is developed then it can be seen as an innovation. This is especially relevant to NPS products; they may not be newly synthesised but they may be newly used. For example, mephedrone was first synthesised in 1929, but only emerged as a recreational drug in the early 2000s. An individual may have known about an innovation for a long time but not formed an attitude, favourable or unfavourable, towards it and therefore has not adopted or rejected it (Rogers, 2003).

According to the theory, there are five attributes which determine the rate of adoption of innovations: relative advantage, compatibility, complexity, trialability and observability. These attributes can be perceived negatively or positively, but if there are high levels of all but complexity, then there should be a faster rate of adoption.

Relative advantage

Relative advantage is the first of the five main attributes which influence the adoption of an innovation. Relative advantage is defined as the extent to which ‘an innovation is perceived as better than the idea it supersedes’ (Rogers, 2003: 15). This can be measured in economics, functionality, convenience, prestige and satisfaction (Atkin et al, 2006; Aizstrauta et al, 2015). The greater the perceived relative advantage of an innovation, the faster its rate of adoption (Rogers, 1983). For NPS users, relative advantage may reflect the extent to which an NPS product is ‘better’ than existing controlled drugs or other NPS products; for example, price, purity (and consistency in both) or acute psychopharmacological effects (e.g. euphoria).

The relative advantage of an NPS will be explored in terms of price, legality, accessibility, availability, purity, the relationship with traditional illegal drugs such as cannabis, MDMA and cocaine, psychopharmacological effects, side effects and lack of detection in drug testing.

Price

The innovation needs to be technically superior in costs to products already existing. The connection between perceived economic benefits and likelihood of the adoption of an innovation has been extensively reported in the DOI literature (Rogers, 2003; Ansari et al, 2010). The economics of NPS products relates to their profitability in terms of cost analysis of purchasing an NPS product: of price, convenience, satisfaction, the effectiveness of the product and the risk involved in consuming the

product. Measham (2013) warned though that cost-benefit analysis is constrained by the unpredictability of NPS use.

The price of an NPS is determined by supply and demand as well as competition and legal restrictions and although the price of an NPS is a relative advantage, prices of NPS vary greatly across countries (Stogner, 2015). It is acknowledged that obtaining accurate prices of illegal drugs as comparisons is challenging, however, NPS substances overall are seen as cheaper (Hillebrand et al, 2010). ‘Price’ is an obvious relative advantage of any innovation; however, the successful diffusion of an NPS product is dependent on factors which may be more important than the cost of using the product.

The effect that the PS Act will have on the price of NPS is unknown. Nevertheless, it is likely that the price of NPS products will increase as the legal status changes and accessibility becomes more difficult.

Legality

The legal status of an NPS product also causes an individual to evaluate the costs and benefits of the product. The relative advantage of an NPS in terms of legality relates to the extent to which a legal substance outweighs the costs of illegal substances. Costs include seeking supply methods but also the ‘costs’ of engaging with criminals in order to obtain the product, involvement in criminal behaviour and uncertainty of the purity of the substance. Reported recreational use of NPS by some individuals may be owing to their desire to not be involved in criminal activity and also those looking to experiment (National Assembly for Wales Health and Social Care Committee, 2015). Furthermore, NPS legality offers important advantages such as greater ease of access and availability (e.g. online retailers). Convenience is an important relative advantage in comparison with a previous technology; for an NPS product, this will involve convenience of accessibility and availability which is related to legal status (Vassuer and Kemp, 2015). The role of accessibility and availability will be explored next in this chapter. Legal status may reduce the ‘costs’ of NPS but various studies have suggested that it is not a major factor in purchase decisions, especially as most users also have experience with illegal drugs (Kelly, 2011; Stogner, 2012; Winstock and Barratt, 2013; Corazza et al, 2014a; The New Psychoactive Substances Review Expert Panel, 2014; Van Amsterdam et al, 2015). It is a ‘secondary’ rather than a ‘primary’ motivation for use (Van Amsterdam et al, 2015: 4).

The example of the rise in BZP popularity in New Zealand however, demonstrates how legal status was considered a relative advantage compared with competitors. Cohen and Butler (2011: 100) suggested that without their legal status, BZP products lose their ‘main advantage’ and young people would use other illicit drugs such as MDMA instead as BZP was not seen as having greater desired acute effects. The ease of access of legal BZP, for some however, was not seen as a relative advantage

and was instead perceived negatively for those who wished to reject conventional culture and rebel (Sheridan and Butler, 2010; Wilkins and Sweetsur, 2013). Furthermore, the illegality of a substance may serve as a relative advantage in that it becomes more desirable as it is perceived to have greater potency (Stogner et al, 2012).

Following control, use usually declines. However, there are occasions when control of a NPS has ‘little or no impact’ (UNODC, 2013: xi-xii). In the case of mephedrone, despite it becoming a controlled substance, there was not a significant impact on levels of use and there is still continued use (McElrath and O’Neill, 2011; Winstock et al, 2011; Bruno et al, 2012; Dybdal-Hargreaves et al, 2013; O’Brien et al, 2014; Kapitány-Fövény et al, 2015). This suggests that its previous legal status was not the main relative advantage attributable to its diffusion. However, it has been suggested that the change in legal status of mephedrone *did* have an effect on levels of use (Freeman et al, 2012; Kelly et al 2013; Zawilska and Wojcieszak, 2013) although whether this can be attributed directly to legislation is debatable.

The importance of legality and its role as a relative advantage appears to be dependent on the user. For existing users of illegal drugs, legal status will have little effect on the motivation for use (Stephenson and Richardson, 2014) as legislation does not ‘quench’ their supply or demand (Ledberg, 2015: 74). Conversely, for individuals who do not use illegal drugs but use NPS, which is a very small number, the legal status of an NPS would act as more of a motivation (Stephenson and Richardson, 2014). There is limited evidence however, which confirms this (Sheridan and Butler, 2009; Stephenson and Richardson, 2014). In the rational choice perspective in criminology, if there is decreased perceptions of legal risks there is likely to be higher rates of usage (Khey et al, 2014). For SCRA, lower legal risk should result in natural cannabis users switching to SCRA. However, because there is a ‘relatively low risk’ of arrest for natural cannabis use, legality may not be an important factor (Khey, 2014: 47).

The key change in relation to the PS Act in the UK, which was introduced in May 2016, was legal status: NPS changed from being quasi-legal products to illegal products. The change in legal status will have implications beyond the change in legality; for example it will mean that products are less accessible. The change in legal status is likely to have a greater impact on previous non-users of drugs in contrast to current users of illegal drugs. Some NPS users may have been engaging in NPS use because of their legal status and as a result of the change, they may choose to use traditional illegal drugs instead or not use drugs at all. In relation to the DOI, the change in legal status will mean that NPS no longer have the relative advantage of legality and therefore may not be seen as having a relative advantage over traditional illegal drugs. Subsequently, other relative advantages

and attributes of the innovation itself are likely to become more important, for example the psychopharmacological effects.

Accessibility

For the purposes of this analysis, accessibility is the ability to purchase NPS through headshops and online legally. The accessibility of NPS as ready to access products is in contrast to the more traditional drug markets in which 'knowing people' who have the required illicit substances is necessary (National Assembly for Wales Health and Social Care Committee, 2015: 21). If this relative advantage is the most important reason for the use of particular NPS, then if there is declining accessibility of the substance it should be replaced with other more accessible alternatives (Measham et al, 2010; McElrath and O'Neill, 2011). However, both MDAI and naphyrone, which were marketed as alternatives to the banned mephedrone, had lower levels of use even though they were both legal (Measham, 2013) and therefore more accessible. It is uncertain whether accessibility plays a role in independent diffusion or whether the relative advantage of accessibility only applies in a direct comparison of the illegal drug the NPS is attempting to or is marketed as imitating.

The internet has been described as a 'potent vehicle' for the further diffusion of NPS products (EMCDDA and Europol, 2013: 140). It is important to briefly explore its role in the diffusion of NPS in terms of accessibility of NPS products. The internet will also be explored in its role as a communication channel later in this chapter. The role of the internet in the rise of the popularity of NPS has been widely acknowledged: the new online market is global, readily available and has resulted in changes to the distribution, sales and marketing of products (Kelly, 2011; Prosser and Nelson, 2012; Sedefov et al, 2013; Coppola and Mondola, 2015; Goggin et al, 2015; Young et al, 2015). The 'real NPS boom' occurred due to globalization and the technological advancements which led to global online retailing and the decrease in synthesising costs (EMCDDA, 2015b: 6; Nekola and Moravek, 2015: 230). The online NPS market is transient and is largely dependent on market pressures and legislation. There is access to the products twenty-four hours a day, privacy, anonymity and an 'unlimited number' of products available (Corazza et al, 2014b; Orsolini et al, 2015b) which cannot be offered by the traditional illegal drugs market. Furthermore, the online market removes the 'personal interactions with drug dealers' associated with the traditional illegal drug market (Smith and Garlich, 2013: 61).

The PS Act comprised the closing of headshops and the selling of NPS products on UK websites. In the succeeding six months following the 26th of May 2016, 332 shops in the UK were stopped from selling NPS and 31 headshops have been closed down (Home Office, 2016). It will be interesting to see how the Act affects the use and prevalence of NPS and this can determine the importance of

headshops and UK based websites selling NPS. It is possible that for some users, for example experimental users or individuals with no previous drugs history, that accessibility offered a key relative advantage for the use of these products. Without this attribute, NPS may not offer an obvious advantage over traditional illegal drugs and therefore individuals may revert to or begin the use of traditional illegal drugs instead.

Availability

Availability is the ability to purchase NPS geographically. The importance of availability as a relative advantage could be highlighted through the example of mephedrone. One aspect of the emergence of mephedrone occurred at the time when there was low availability of MDMA and cocaine. If a substance is not easily available, it is unlikely to spread or reach a level of problematic use (Stogner, 2015). Nevertheless, it appears that there needs to be other relative advantages present for a product to diffuse. An NPS may be widely available but if it has high levels of unwanted side effects or low levels of desired psychopharmacological effects then it is unlikely to diffuse.

Purity

The purity of an NPS product is an important relative advantage in determining how a product is 'better' compared to alternatives. The levels of purity of particular NPS products and choosing an online retailer form an important part of the online market. The role of purity is highlighted in the case of mephedrone: the purity became more apparent in a 'setting of decreased potency of illegal narcotics' (Johnson et al, 2013: 1111) and in 'ripe market conditions for an effective licit competitor to gain a foothold' (Winstock et al, 2010b: 159). One of the key reasons for the popularity in mephedrone, beginning in 2008, was the declining purity, and availability, of both MDMA and cocaine (Brunt et al, 2011; Schifano et al, 2011; Davidson, 2012; Corazza et al, 2014b). The purity of mephedrone was seen as more or 'relatively' reliable (Carhart-Harris, 2011: 20; Van Hout and Brennan, 2011: 265) and consistent than MDMA or cocaine (German et al, 2013). However, the reliable purity of mephedrone declined following its ban in the UK (Wood and Dargan, 2012).

The importance of purity as a relative advantage was questioned in relation to users being aware of what they have consumed. In the study by Measham et al (2011), some of the drug users were not aware or did not care about the 'specific content' of the white powders they were consuming, if they had stimulant effects. Measham (2013: 115) also suggested that a perceived 'wholesale displacement' from established illegal drugs to NPS due to purity levels may be too simplified and factors such as

psychopharmacological effects or ease of accessibility will also have played a role. Nevertheless, the role purity played in the increase of popularity of mephedrone is apparent.

The relationship between NPS and traditional illegal drugs

Greenhalgh et al (2004) emphasised that if relative advantages were not obvious, users will be unlikely to discontinue use of their current preferred technology for a replacement. This is especially important in relation to users choosing NPS products over traditional illegal substances. The effects of synthetic cathinones have been compared to MDMA, cocaine and methamphetamine; many NPS attempt to replicate the effects of MDMA (Liechti, 2015). However, from a psychopharmacological perspective, no NPS replacing ecstasy is ‘as satisfactory’ to users as the original compound, MDMA and its ‘unique psychoactive properties’ (Brandt et al, 2013: 278; Nichols and Fantegrossi, 2014: 575, 583). Other NPS are interpreted as legal alternatives to controlled substances for example 25I-NBOMe is seen as a legal LSD alternative (EMCDDA, 2014) and the effects of SCRA are marketed as cannabis substitutes. Natural cannabis is the most commonly used illicit drug globally among all age groups (EMCDDA, 2015a) and therefore its superior popularity highlights the lack of comparable greater effects of SCRA (Khey et al, 2014).

For an NPS product to diffuse and not ‘quickly disappear’, it needs to be superior to the traditional illegal drugs (Van Amsterdam, 2015: 5). NPS need to be ‘similar’ to the more traditional illegal drugs, in psychopharmacological effects but also each new substance will have ‘novel’ effects which will differ from existing drugs in ‘subtle but interesting’ ways (Bruneel et al, 2014: 371). However, substances with ‘truly novel’ effects, like salvia divinorum, do not see widespread use (Stogner, 2015: 2). When an individual selects an NPS as a replacement for an illegal drug, they do so based on a relative advantage of the NPS which avoids a perceived negative repercussion associated with the traditional substance (Khey et al, 2014). The relationship with traditional illegal drugs and NPS also relates to availability. For example, problematic drug users were seen to substitute traditional illegal drugs such as opiates with NPS which were more easily available (Barnard et al, 2014).

The PS Act will have an important effect on the relationship between NPS and traditional illegal drugs. NPS will lose their additional relative advantages such as legality and accessibility. Therefore, NPS will need to offer alternative relative advantages over their traditional illegal drug counterparts in order to diffuse. Without these advantages, if an NPS offers psychopharmacological effects which are not equivalent to or do not exceed those of traditional illegal drugs then they are unlikely to diffuse.

Psychopharmacological effects

Psychopharmacological effects relate to the extent to which a NPS product produces effects which are preferential to other drugs or at least equivalent to existing drugs. The relative advantage of a product in relation to effects will vary for different individuals. Different NPS products are chosen to produce various desired effects, for example synthetic cathinones will be chosen for their euphoric effects and NPS hallucinogen products will be chosen for the perceptual changes that they produce. Furthermore, the psychopharmacological benefits of a product will have another meaning for problematic or injecting drug users. For MDMA, its perception as a ‘relatively benign’ substance may have assisted in its diffusion acceleration into the population (Ferrence, 2001). User satisfaction is an important influence of perception of relative advantage (Rogers, 1983; Eder et al, 2015) and this can be seen in relation to psychopharmacological effects. There must also be a pre-existing user population using a substance with similar effects (Stogner, 2015). Furthermore, for continued and successful diffusion there must be habitual use and the effects must be perceived as positive with minimal negative side effects (Barnard et al, 2014; Stephenson and Richardson, 2014; Stogner, 2015). If an NPS product has superior effects and legal status, which affects accessibility and price, the product should eventually ‘surpass’ its illegal equivalent but growth will be staggered as loyal users are reluctant to switch substances (Stogner, 2015: 3).

The importance of psychopharmacological effects will become more pronounced with the introduction of the PS Act. An NPS will need to have the desired level of effects to diffuse over a traditional illegal drug as it will no longer have other relative advantages. This change may lead to street chemists placing greater emphasis on creating NPS with higher levels of desired effects. The psychopharmacological effects of a drug are arguably the key relative advantage of an NPS product; an NPS product having a ‘good effect’ is described as a ‘critical component’ of their attraction (Barnard et al, 2014: 85). They play an important role in determining whether an NPS will diffuse successfully or not. NPS products are perceived to have failed to replace traditional illegal drugs as they only deliver mild effects or strong negative side effects (Griffiths et al, 2010). Users experiencing negative side effects would need to decide whether the product gave them the required psychopharmacological effects, value for money and enough relative advantages over alternatives to continue with use.

Side effects

Whilst psychopharmacological benefits are an important relative advantage for users, minimising the negative side effects associated with use is also an important cost benefit analysis. Even if an NPS has an obvious relative advantage such as accessibility, if it has immediate unpleasant side effects

the substance is unlikely to widely diffuse (Stogner, 2015). The extent of side effects is also important. For BZP, the negative hangovers experienced were reasons for discontinuing use and the low dependency potential meant that following prohibition its popularity did not remain (Wilkins and Sweetsur, 2013). The decline in use however, also related more generally to a decrease in the popularity of amphetamine/methamphetamine in New Zealand; this highlights the important relationship between traditional illegal drugs and NPS products (Wilkins and Sweetsur, 2013).

Lack of detection in drug testing

Finally, a relative advantage which appears unique for certain NPS products is a lack of detection in traditional drug tests. For certain groups, the lack of readily accessible detection laboratory methods is an obvious relative advantage. For example, experimental adolescents or military personnel being able to use drugs without detection is an advantage over more traditional illegal substances (Johnson et al, 2013; Lindsay and White, 2013). One of the main reasons given for the popularity of SCRA is their lack of detection in drug tests (Schifano et al, 2009; Dabrowska and Bujalski, 2013; Kelly et al, 2013; Wagner et al, 2014; Clark et al, 2015) especially among individuals on parole or currently in prison (Conchiero et al, 2015; Weaver et al, 2015). For prisoners, a lack of detection would be one of the most important relative advantages. Despite advancements being made in detecting NPS, the transient nature of the market means that there will always be products which are not detected. The variable composition of SCRA products makes detection difficult (Nelson et al, 2014). More than 500 SCRA have been detected and with each new molecule modification, detection becomes more difficult (Bertol et al, 2015).

In conclusion, the relative advantage aspect of the innovation itself to use the DOI to describe the diffusion, and rate of diffusion, of an NPS appears appropriate. Indeed, of individual factors, relative advantage is the 'single most important attribute' contributing to the adoption of any innovation (Corrigan, 2012: 934) and is the 'most obvious attribute' that adopters look for in an innovation (Eder et al, 2015: 46). The psychopharmacological effects of a product appear to be a key relative advantage. However, predicting the diffusion of a NPS product is challenging in that the subjective assessment of the effects of a substance will partly affect the probability of widespread use (Stogner, 2015). Nevertheless, identifying the key relative advantages of NPS products for users will help gain an understanding into why certain NPS diffuse and others fail to do so. Reasons why some products diffuse and others fail to do so, appear to be broadly similar to those of taking traditional illegal drugs. However, there are some factors which make them unique from illegal drugs. The popularity of NPS is 'likely multifactorial' with motivations, which have all been identified as relative advantages, such

as legality, price, accessibility, availability, lack of detection from drug testing, effects and purity all playing a role (Coppola and Mondola, 2012; Rosenbaum et al, 2012; Dean et al, 2013; Measham, 2013; Miotto et al, 2013; Seely et al, 2013; Vandrey et al, 2013; Castaneto et al, 2014; Nelson et al, 2014; Smith and Robert, 2014; Stephenson and Richardson, 2014). If the relationship between these different factors and between NPS and traditional illegal drugs can be understood, then key groups of NPS users can be identified (Measham, 2013; The New Psychoactive Substances Review Expert Panel, 2014). The relative advantage of an NPS product, in its different forms or in combination, appears to be the key reason for the adoption of an NPS product; it is however important to analyse the roles of the other attributes which determine the rate of adoption of a product: *compatibility*, *complexity*, *trialability* and *observability*.

Compatibility

Compatibility is the extent to which an innovation ‘is perceived as being consistent with the existing values, past experiences and needs of potential adopters’ (Rogers, 2003: 473). It is the perceived ‘fit’ of an innovation. Compatibility as an attribute has been criticised for lacking a clear definition in referring to the three different dimensions (Claudy et al, 2011). For NPS, this may be confusing in that a product may be compatible in terms of needs of potential adopters but the innovation may not be compatible in terms of existing values. Compatibility is the extent to which an NPS product is compatible with the purpose and motivations of drug use. For example, in terms of psychopharmacological effects the purpose of use may relate to clubbing, appreciating music, sociability, relaxation or enjoying perceptual changes. Compatibility is explored in the form of an NPS, marketing and the risk and dependence potential of an NPS product.

Form

Compatibility may relate to the form of an innovation, for example an NPS product in tablet form may be preferential to different users instead of administration through smoking. The form of the product is an important aspect of their compatibility to the personal preference of the user. The more compatible an innovation is, the more the level of uncertainty for the individual will decrease (Lin and Chen, 2012) and the greater chance of potential adopters using the innovation correctly (Zolkepli and Kamarulzaman, 2015). The form of an NPS can also relate to its route of administration and this must be compatible for the user. NPS forms include tablets, plant material, smoking blends, powders or liquids. Bromo-Dragonfly is usually sold in blotter paper or liquid form (Corazza et al, 2011) and Khey et al suggested that it is ‘far more challenging’ to acquire than other NPS products as users must ‘actively’ seek it out and have the financial means to do so (2014: 69). Therefore it is not

compatible and will not reach wide levels of diffusion. The form of a NPS product is likely to influence the drug category of choice but it is unlikely that a product would diffuse over another because of its form without other benefits of the innovation itself.

Marketing

The packaging and names of NPS must be compatible for the user. The name of an innovation is an 'important part' of its compatibility: the name should have a clear meaning for the adopter (Sahin, 2006: 18). Compatibility is one of the most important attributes of an innovation which affects intention. Therefore marketers need to determine who would most benefit from the innovation and market the product accordingly (Arts et al, 2011). Names of NPS products have been 'carefully designed' to 'appeal to a youthful crowd' especially those who frequent clubs (Arnold, 2013: 15; Corazza et al, 2014b: 290; Bertol et al, 2015). Names include 'Lucifer', 'Chaos', 'Bliss', and 'XXX Strong as Hell' (Kapka-Skrzypczak et al, 2011; Rosenbaum et al, 2012; Arnold, 2013; Corazza et al, 2014b; Nichols and Fantegrossi, 2014). Product names which convey the desired psychopharmacological effects are more likely to diffuse. For example, for the product 'Psychone', the name may relate to the slang expression which indicates 'an individual who is reckless and fearless... like a hurricane, crazy' (Santacroce et al, 2015: 266). Some products are named after the role of the product as a legal substitute of an illicit drug: 'E = XCT', 'Charlie', 'Fake cocaine' or 'Legal E' (Hillebrand et al, 2010; EMCDDA and Europol, 2013).

The packaging of many NPS products suggest the contents are 'harmless, even fun' and the information provided does not indicate what the substance actually is (Arnold, 2013: 15). Products are sold in colourful, sealed packages with various 'hippy' or 'new age' symbols (Kapka-Skrzypczak, 2011: 304). One of the reasons for the diffusion of mephedrone across Europe was the 'particularly aggressive marketing policy' online (Aromatorio et al, 2012; Stephenson and Richardson, 2014: 30) and by headshops and street dealers (Vardakou et al, 2011). Unique packaging and brand names among competitors lead to association of particular products with recognised purity or effects (Smith and Garlich, 2013).

Following the PS Act in the UK products will not be marketed as they have been previously. Therefore if the marketing of these products affected the compatibility for the user, then through the Act, this marketing will be lost and they will be marketed in the same way as traditional illegal drugs. The packaging of NPS was linked to appealing to a younger audience and therefore this change may affect the user base using NPS and affect the popular opinion by the media that the predominant users of NPS are younger users. The effect of the Act on marketing is unlikely to be the only effect on

altering the audience engaging in NPS use. This is likely to also extend to legality and accessibility changes.

Risk and dependence potential

The compatibility of an NPS product also relates to the risk involved in consuming an NPS product. Risk associated with drug use is extremely varied among substances and users and is difficult to identify (Tackett-Gibson, 2008). The variation of risk associated with use relates to the dosage, poly drug use, route of administration, setting, the user and the attributes of the particular substance (Tackett-Gibson, 2008). Therefore, when an innovation is more compatible, the uncertainty of use will decrease and therefore users are more likely to utilise the innovation correctly which may decrease the level of risk associated with use. The nature of NPS products means that new substances are introduced on a regular basis and there is no knowledge relating to an individual's exposure, response or tolerance (Freeman et al, 2012; John-Smith et al, 2013). NPS users are exposed to unidentified products in unknown concentrations which increases the risk of overdosing (Ayres and Bond, 2012). Conversely, Barnard et al (2014) reported that for one of the participants in their study, the risk involved in consumption of NRG-1 became part of its appeal.

The diffusion of a substance also relates to its dependence potential, but it is a complex relationship (Stogner, 2015). The dependence potential could be seen to apply to the compatibility of an innovation. Substances which have a greater dependence potential are 'more likely' to result in repeated use and habitual users; this is more likely to occur when a substance acts as a substitute for a traditional illegal drug where dependence exists (Stogner, 2015). Conversely, if a drug obtains a reputation of being addictive and a drug of dependence, such as heroin, this may mean that is less likely to be initially adopted and diffuse.

When heroin was introduced, it was transmitted through friendship social networks of pre-existing drug users; this diffusion highlights the importance of compatibility and observability attributes (Ferrence, 2001). For former or existing heroin or crack cocaine users, there have been reports of users injecting mephedrone or other synthetic cathinones to detox from heroin or crack cocaine (Barnard et al, 2014; Stephenson and Richardson, 2014). The fall in supply of the heroin market in 2010 and 2011 had an effect on the popularity of injecting replacement synthetic cathinones (Smith and Garlich, 2013; Sumnall et al, 2013). The intravenous use of mephedrone is associated with a higher frequency of daily injecting which contributes further to health issues (Kapitány-Fövényi et al, 2015). Other NPS products such as fentanyl have also been marketed and used as replacements for heroin or sold directly as heroin; this however appears to be geographically isolated to particular countries such as Bulgaria, Slovakia, Hungary and Romania (Mounteney et al, 2015). Fentanyl have

been described as ‘highly potent’ which increases the risk of overdose especially in cases where the substance is being sold as heroin (EMCDDA, 2015b: 10); they have low levels of use but high levels of risk or harm (Mounteney et al, 2015).

In conclusion, the role of compatibility is important although it is less influential to that of relative advantage. However, it is important to recognise the importance of compatibility in the diffusion of an NPS product. If a product is not compatible, the level of intention to use will be low and overcoming this initial barrier will be a challenge.

Complexity

Complexity is the degree to which ‘an innovation is perceived as difficult to understand and use’ (Rogers, 2003: 474). An innovation with low levels of complexity is likely to have a faster rate of adoption than a more complex innovation and less likely to be rejected. Products which have high levels of complexity but ‘novel attributes’ may be perceived negatively because of the anticipated learning costs and difficulties (Claudy et al, 2011: 1462). Conversely, the complexity of an NPS product may appeal to users in that it may suggest higher quality, novelty and advancement; consequently, there may be an increase in interest for adoption intention but it may act as a barrier to actual adoption (Arts et al, 2011). Therefore, NPS products which have lower levels of complexity but also lower levels of desired psychopharmacological effects may diffuse at the expense of a more complex NPS product but one with higher levels of psychopharmacological effects.

A product which requires a range of components obtained from different sources may have a lower chance of diffusion because of the time and effort associated with use. This may be the case with ayahuasca mixtures which involve a complex preparatory procedure which may discourage users. Complexity may also relate to ease of access of the products; if a product is easily accessible, this may aid in the chances of diffusion.

To conclude, complexity may not be as important as relative advantage or compatibility, indeed Rogers (1983) suggested that the influence of the perceived complexity on the adoption of a new innovation has been weakly supported. However, the role of complexity may have different implications for the different adopter categories; whilst it may play a key role for the early and late majority, complexity may not be an important reason for not adopting a product for innovators and early adopters. Nevertheless, high levels of complexity of a product will pose a challenge for opinion leaders and change agents promoting use of the product though reducing uncertainty associated with

use. The different adopter categories, opinion leaders and change agents will all be explored later in this chapter.

Trialability

Trialability has been defined as ‘the degree to which an innovation may be experimented with on a limited basis’ (Rogers, 2003: 476). The likelihood of innovation adoption increases when there is an opportunity to trial the innovation (Bennett and Bennett, 2003; Lin and Chen, 2012; Karakaya et al, 2015) and assess the level of change and risk required if adoption takes place (Ferrence, 2001; Arts et al, 2011; Barrette, 2015).

Promotion

For NPS, trialability was portrayed through sites offering and promoting ‘free samples’, ‘buy one get one free’ and ‘price match guarantees’. Special deals offered by retailers included the ability to buy a ‘single dose’ of a product for a low price as opposed to committing to a large amount of a product. In a more traditional drug market (Prus, 1989; Jacobs, 1999), Coomber suggested that dealers of crack cocaine in the USA use techniques of ‘cultivation’ to ensure loyalty and custom through providing ‘extra free samples’, ‘a little extra’ and credit to customers once a relationship of trust has been developed (2006: 47, 51).

Although trialability through free samples will still be available from non-UK based websites, importation will be an offence in accordance the PS Act. Furthermore, the Act will change the ability of an individual to trial a product. Before the Act, an individual could walk into a shop to purchase a product to experiment or purchase a product online without legal ramifications and with relative ease. However, following the Act the trialling of a product will become more challenging; it is likely to involve interactions with the underground market or the darknet cryptomarkets. The role of trialability appears to still be important in the traditional drugs market and consequently may translate to the NPS underground market which may emerge following the Act.

In conclusion, the importance of trialability has been questioned (Paudyal et al, 2013) and Vollink et al stated that ‘no significant relation’ was found between trialability and intention to adopt an innovation (2002: 341). Nevertheless, in a similar way to complexity, different adopter categories may view trialability as important or not; earlier adopters may view it as more important than later adopters (Sahin, 2006). Trialability in relation to NPS is difficult to assess, as drugs producing subjective effects or an altered state are different to technologies which simply have an external

function. A thorough process of self-administration of a product enables an NPS consumer to see how the product works for themselves as opposed to relying on subjective accounts or ‘trip reports’ made by other users. Trialability may be an accepted part of NPS use as users will trial products to determine which products they favour. Therefore, trialability is seen in a different manner to how Rogers’ viewed it as an attribute of a technology.

Observability

Observability is ‘the degree to which the results of an innovation are visible to others’ (Rogers, 2003: 475). A highly visible and trialable product, which has visibly positive results, will have greater trialability and observability and will stimulate peer discussion of a product (Van Rijnsoever et al, 2009). Observability is also the ease in which a product can be observed and then communicated through formal and informal social networks (Wagner Weick and Walchli, 2002). For NPS, this is likely to be through online forums or friendship networks. Online drug discussion forums allow participants to share their subjective drug experiences; if an NPS product has consistently positive reviews, a potential adopter will be more likely to adopt the product. If an NPS product receives constantly negative reviews, the probability of diffusion decreases. Similarly, offline observations are also crucial for the diffusion of an NPS product: if a member of a social friendship group has had observable positive experiences from the consumption of an NPS product, there is a greater chance of successful diffusion.

In conclusion, the observability of an innovation plays an important role in the diffusion of a product and is applicable to the diffusion of NPS. However, for this critical analysis there is a greater focus on the observability of an NPS product in relation to communication channels.

The applicability of Rogers’ DOI element of ‘the innovation itself’ in relation to NPS appears appropriate. The relative advantage, compatibility, complexity, trialability and observability of an NPS product are likely to play an important role in whether a product diffuses, and the rate at which it diffuses, or not. The relative advantage of a product, through the form of its psychopharmacological effects, appears to be the most important factor in the diffusion of an NPS product in relation to the innovation itself. However, different relative advantages are likely to have varying levels of importance for different user groups.

Communication Channels

The second element of the DOI is the communication channels through which participants create and share information with each other to reach a mutual understanding (Rogers, 2003). The essence of the communication process is that one individual originates and communicates a new idea to a single individual or several individuals who have not yet adopted it (Rogers, 2003). Communication channels include the mass media channels, which are most effective at creating initial awareness of the innovation, and interpersonal channels which are most effective at forming and changing attitudes towards the innovation including whether to adopt or reject it (Rogers, 2002). Communication also includes the extent of homophily or heterophily in the social system.

In relation to NPS, the communication channels are the mass media as a whole and interpersonal channels which comprise offline friendship networks and online drug discussion forums. These three channels are likely to be the main channels in which individuals will hear about a particular NPS product for the first time and the channels will influence their opinions towards the product.

Mass media channel

The mass media is key in the first step of the innovation-decision process which is the knowledge stage. During this stage, the mass media can disseminate information effectively at a high speed (Baek et al, 2016) to a large number of people. The mass media plays a 'critical role' in providing knowledge about and knowledge of the existence of a new innovation and initially shaping people's perception of that innovation (Wei and Zhang, 2008: 173). Baek et al explained that the mass media is capable of changing 'weak attitudes' (2016: 5) although it may be unable to influence people into accepting an innovation (Katz et al, 1963). Mass media in the traditional sense includes newspapers, radio broadcasts and the television (Eder et al, 2015). However, the internet has emerged as a form of mass media. In the traditional sense of the 'mass media', it is challenging to suggest that newspapers or television produce the initial awareness of an NPS product to the NPS user population. However, the media as a communication channel is not restricted to newspapers but also includes open access forums or culture magazines.

The role of the media as a communication channel may differ between different adopter categories. Early adopters are the most frequent users of mass media and they tend to use more types of mass media (Wei and Zhang, 2008). For the late majority, the media may provide awareness of an NPS product; for example, the popularity of searching for mephedrone rising following reports of mephedrone related deaths. Lancaster et al (2011) highlighted the lack of research which has focused on assessing the impact of the media on the public perception of drugs and drug users. Nevertheless, the role of the media in inadvertently advertising NPS was recognised in the literature (Deligianni et

al, 2017). Media reports advertised their potency, availability and legal status (Stephenson and Richardson, 2014) and allowed readers to discover where to purchase mephedrone, either through finding the websites themselves or through the automated adverts appearing beside the article which sometimes occurred (Forsyth, 2012). The most significant increase in purchasing interest of mephedrone, especially in the UK, occurred after the reporting of an alleged mephedrone-related death according to Google Insights for Search (Winstock et al, 2010b; Forsyth, 2012; Wood and Dargan, 2012). Similarly, following a number of stories reporting on alleged prescription opiate deaths, the number of overdoses from prescription opiate deaths increased significantly (Bright et al, 2013).

Individuals who do not have contact with drugs or drug users tend to form opinions from the portrayals in the media (Gelders et al, 2009). The reporting by the media of the NPS problem has been described as ‘sensationalist’ with a focus on legal and criminal perspectives as opposed to the harms of NPS use (Kassai et al, 2017b). Despite this, Kassai et al (2017b) highlighted the necessity to continue monitoring the media because of the transience of the NPS market and suggested that it could be treated as an early warning system. However, the bias of the media reporting may affect this. Although the media may play an important role in raising awareness of a product, it seems important later on in the diffusion process, when drugs move from early adopters to the early or late majority.

Interpersonal channel

The key stages for interpersonal channels are the persuasion, adoption and implementation stages; support, information and legitimation are needed (Barrette, 2015). In contrast to the mass media, which has ‘high immediacy and high diffusibility’, interpersonal channels have characteristics of ‘high persuasion and two-way communication’ (Baek et al, 2016: 5). Information disseminated based on personal experience is ‘much more effective’ than mass media in facilitating the adoption of an innovation (Harrer et al, 1988: 100); they are effective in forming and changing attitudes to an innovation (Rogers, 2002).

Interpersonal channels are the ‘dominant mechanism for diffusion’ (Greenhalgh et al, 2004: 601). They include friendship networks, prison communities, schools, work places and drug using networks (Furst, 2014). In relation to NPS and this critical analysis, interpersonal channels are friendship networks and online drug discussion forums.

Friendship networks

Although the internet is perceived as the reason for the spread of NPS products, the role of peers is also prominent and, in keeping with traditional illegal drugs, is how information about NPS is diffused and products accessed (Khey et al, 2014). A strong ‘social connectedness’ within a peer group will act, not only as a strong motivation for use, but also as a coping strategy (Kjellgren and Jonsson, 2013: 197). In relation to offline pressures to try different NPS products, individuals will respond to interpersonal network influences to conform to group pressures to create or preserve a particular social image in a group (Song, 2014).

Although the focus of this critical analysis surrounds NPS, it is necessary to briefly examine the role of drug dealing networks more generally. The majority of new experimenters are given, or are at least exposed to, a new drug by friends, acquaintances or family members (Coomber, 2006). Coomber (2006: 1, 172, 173) explored the myth of the ‘drug dealer’. He explained that in reality, the evil, amoral ‘drug dealer’ stereotype does not exist or has been ‘unreasonably exaggerated’ and violence is not a prominent part of the drug market for many who work in it. In the research by Murphy et al (1990), the role of an individual as a dealer came about as a result of supplying friends and creating and maintaining good networks through which new clients could emerge. The open markets of the NPS online shops are in contrast to the more typical closed markets associated with illegal drug use where there is a greater reliance on social interaction, trust and networking to maintain a ‘consistent client base’ (Adler and Adler, 1994). The influence of friendship networks plays an important role in influencing the use of traditional illegal drugs and in the diffusion of NPS.

Online forums

Originally the focus in conventional diffusion theories related to physical proximity of adopters; Rogers explained that interpersonal channels comprised a ‘face-to-face exchange’ (1983: 18). However, the focus appears to have now shifted towards social relationships (Redmond, 2004) and this appears particularly appropriate in the growth of online users and online drug forums. Rogers’ 1962 DOI was created before the advent of the internet, and although it is alluded to in later versions of the theory, its role in interpersonal channels is not fully explored. Lillie suggested that Rogers does not ignore the internet, and its role as a communication channel, entirely; it is described as an ‘interpersonal communication’ (2008: 267).

The mass media and interpersonal channels separately do not ‘fully capture modern communication trends’ and the ‘increasingly blurred boundaries’ between them created through the internet to form a ‘dual link’ model (Lillie, 2008: 267; Mani and Dhingra, 2012: 163; Nordin et al, 2014: 771). Reardon and Rogers (1988) confirmed that it is difficult to divide the two communication channels

because of the appearance of new communication technologies. For example, they highlighted social media as an example of an ‘evolved form of existing mass media’ but which had characteristics of both interpersonal channels and mass media channels because of the ability to have two-way communication (Reardon and Rogers, 1988; Baek et al, 2016: 5, 17). YouTube (and other social networking sites) is presented as an example of a ‘modern breakdown’ between the mass media and interpersonal channels. It is an example of a modern definition of mass media through allowing a ‘one-to-many’ form of communication (Lillie, 2008: 267). However, it is also an example of an interpersonal channel through allowing a ‘one-to-one’ form of communication (Lillie, 2008: 267). The advancements in technology over the past fifteen years have dramatically changed the nature of not only the drugs market but also the communication surrounding drug use.

Online social networks can be seen as interpersonal communication networks in that they offer a sense of belonging to members of a social system and emotional support (Long et al, 2014). In relation to the DOI, the internet exists as both a communication channel through which information is disseminated and the online drug forums exist as a social system. Drug online forums comprise users sharing personal experiences, blogs, documents, news and private messages (Gonzalez et al, 2013; Vento et al, 2014). Van Hout (2014: 282) emphasised that the importance and power of online forums in diffusing NPS and these ‘online insular drug consumer communities who advocate new drugs, experimentation and optimal user practices’ should not be underestimated. Online communities are able to guide and direct the behaviour of a particular group (Kozinets, 2002) through the content they generate which forms a communal discourse, this influences the members of the community in their drug choice and use (Bilgri, 2016). Online forums also exist as a ‘social support system’ which provides a ‘sense of belonging’ which is especially relevant for ‘relatively idiosyncratic/unusual [psychedelic] drug use’ or those in isolated locations (Orsolini et al, 2015b: 315; Valeriani et al, 2015: 249; Soussan and Kjellgren, 2016: 79). The topic is well suited to the internet because of the opportunity for anonymity and the lack of geographical and legal constraints (Davey et al, 2015).

Personal experiences or ‘trip reports’ provided on user forums play a ‘key role’ in the promotion, initial experimentation or diffusion of an NPS product, especially among individuals actively searching for new products (Gonzalez et al, 2013: 338; Stogner, 2015: 3). There appears to be a general distrust of scientific literature or ‘official authoritative sources’ in forums (Duxbury, 2015: 8, 13) and therefore there is an increased emphasis on personal experience; to allow for other forum members to experiment ‘safely’ (Tackett-Gibson, 2008: 247). Because NPS products are labelled as ‘not for human consumption’ there is a lack of safety information regarding use and dosage so users are reliant on other ways of learning about dosages and methods of administrations (Ayres and Bond, 2012; Jebadurai et al, 2013; Ledberg, 2015). ‘Word-of-mouth’ is seen to have a significant impact

on the decision to adopt an innovation (Ram, 1989: 22). Nevertheless, NPS users, whilst acknowledging positive feedback on a product, will need to assess their needs and preferences of NPS products. For example, whilst a particular synthetic cathinone may be receiving positive feedback if a user is looking for a SCRA, ‘word-of-mouth’ positive communication is unlikely to affect their decision to adopt.

An innovation will be introduced to a social system from an ‘outside source’ and then dissemination will occur through interpersonal channels (Hubbard and Hayashi, 2003: 54). Whether this is applicable to NPS through online forums or not is questionable. The emergence of a new NPS product is likely to appear either through change agents or opinion leaders, which will be explored later in the chapter, known to the forum. A post from an unknown source is unlikely to receive widespread adoption among the social system; members will need to trust the source and see them as credible. The power of interpersonal channels is dependent on the level of trust in the interpersonal network (Harrer et al, 1988). Potential adopters need to overcome their scepticism or uncertainty of an innovation before committing to adoption and need support from interpersonal channel communication channels, and this is achieved through effective change agents and opinion leaders (Agarwal, 1983). For NPS, the importance of trust is especially visible in online forums. Furthermore, there was a divide between members of forums and outsider groups which were formed of unreliable vendors, journalists, the police and some researchers, who did not want their community to be misrepresented (Davey et al, 2015).

In conclusion, Rogers described the role of interpersonal channel exchanges between individuals who have already adopted an innovation and individuals who are then influenced to also adopt as being at the ‘heart of the diffusion process’ (1995: 34). In relation to NPS, if a product has the desired psychopharmacological effects and a low chance of unwanted side effects, if the existence of the product is not communicated then it is unlikely to diffuse. Additionally, this communication needs to be conducted by a trusted individual for diffusion to take place. Whilst the mass media is likely to increase the knowledge of an NPS product to certain user groups, the decision surrounding whether to adopt an NPS product or not is likely to be determined by interpersonal channel influence. Nevertheless, the two different communication channels as determined by Rogers appear appropriate in relation to NPS diffusion.

Homophily and Heterophily

A social network, a group who share similar interests or a friendship group or a ‘specified set of links among social actors’ (Fischer et al, 1977: 33) is one of the ‘most robust’ social determinants of drug

use, and therefore it represents an important factor in the diffusion of an NPS product (Sumnall et al, 2013: 94). Drug use is 'likely' when an individual belongs to one or many networks which are accepting or encourage this behaviour (Krohn and Thornberry, 1993: 103). This aspect of social networks relates to homophily.

Homophily and heterophily are important aspects of Rogers' DOI. Homophily is 'the extent to which two or more individuals who interact are similar in certain attributes, education, social status and the like' (Rogers, 2003: 19). This would include behaviour such as drug use. More effective communication will take place where the two individuals interacting are homophilous: they need to share common meanings, a 'mutual subcultural language... alike in personal and social characteristics' to affect attitude formation and change (Rogers, 1983). However, some degree of heterophily must be present in order for new information to be exchanged (Rogers, 1983). The illicit nature of drug use would suggest that users would form friendship networks with other users who they can trust; homophily 'fosters trust and reciprocity' (Krohn and Thornberry, 1993: 103-104; Hu, 2013: 42) and seeking opinions (Chu, 2009; Ma et al, 2014). Among user groups of particular drugs there can be seen to be high levels of homophily, in terms of attitudes, especially among online forum groups. Online social networks, such as online drug discussion forums, connect individuals with similar interests who exchange information (Boyd and Ellison, 2007; Ma et al, 2014).

For the drug using population as a whole however, the range of different drugs and reasons for drug use indicate that drug users could be heterophilous, in that they do not share similar attributes. Indeed Rogers (2003: 19) stated that one of the most 'distinctive problems' in the diffusion of an innovation is the level of heterophily among participants.

In conclusion, the mass media and interpersonal communication channels play an important role in the diffusion process. It could be argued that they play a more important role in the diffusion process than psychological factors such as complexity and compatibility (Wei and Zhang, 2008). The role of the internet in the diffusion of NPS, both in its role as a communication channel and as a global marketplace, cannot be ignored. The DOI, originally created in 1962, would not have been able to assess the role it has on the diffusion of an innovation and therefore it is difficult to critique the applicability of the theory in this capacity. However, critiquing the role of the mass media and interpersonal channels is still possible and for NPS, although the media may play an important role for certain user groups, interpersonal channels are likely to play a more important role in affecting diffusion.

Time

The third element of the DOI is time. There are three factors that affect the time dimension: the innovation-decision process, characteristics of the adopters and adopter categories. The innovation-decision describes the process whereby an individual first gains knowledge of the innovation, forms an attitude towards it, decides whether to adopt or reject it, implements and uses it and confirms this decision (Rogers, 2003). The rate of adoption is the speed in which an innovation is adopted by the members of a social system which comprises the adopter categories (Rogers, 1983). The adopter categories are the innovators, early adopters, early majority, late majority and laggards. This critical analysis will focus on the adopter categories and their characteristics. The two key adopter groups for the diffusion of NPS are likely to be the innovators and the early adopter categories.

NPS Users

NPS users range from experienced innovators searching for products which offer new and diverse effects to first-time users avoiding the use of illegal drugs (Nekola and Moravek, 2015). The profile of NPS users will vary with the use of different products: a SCRA user is likely to have different characteristics to a mephedrone user or a synthetic opioid user.

Innovators

Innovators are the first 2.5% of a social system to adopt (Cho et al, 2012). They actively seek out information about new ideas and innovations and can cope with higher levels of uncertainty surrounding innovations (Rogers, 2003). With respect to these characteristics, NPS innovators might include chemists creating NPS or high-level distributors with access to such groups. Some innovators will act as ‘street pharmacists’ who are synthesizing new products for the NPS market and will frequently use established research chemicals, which have come from laboratories and scientific journals, to bring them into the NPS market (Nichols and Fantegrossi, 2014: 575).

The term ‘innovators’ can be applied to different terms used in the literature. The term can be applied to the term used by Boyer et al (2007) to describe ‘innovative drug users’ who experiment with NPS after learning about them online. The term ‘innovators’ could also be used to describe ‘e-psychonauts’ who are defined as individuals who have ‘extensive experience’ with NPS and belong to online forums where information regarding NPS is shared (Gonzalez et al, 2013: 338). The term ‘psychonauts’ is a popular and well explored term in the literature (Gonzalez et al, 2013). NPS users have been described as being psychonauts who are more mature, in both age and drug experience, and experiment and engage more in drug discussions on the internet (Van Hout and Hearne, 2017).

Soussan et al (2018: 73) identified individuals who could be recognised as psychonauts who have developed a 'profound academic and scientific-like interest that propelled their use of NPS'. For NPS innovators, the information they are communicating about a product must be perceived to be authoritative enough for the product to be adopted and to diffuse. According to Rogers' theory, they are interested in an innovation 'for its own sake' (Nokelainen and Dedehayir, 2015: 72). Psychonauts have a 'particular interest' in hallucinogens and other psychoactive substances which offer altered states of consciousness (Gonzalez et al, 2013: 338). Innovators are 'driven by sensation-seeking' and 'uniqueness-seeking' motives with the adoption of new products (Jin, 2013: 1906). This is especially relevant for NPS psychonauts; they are driven by uniqueness and sensation seeking motives in creating, rediscovering or synthesising new products.

One of the research questions in this thesis aims to identify which of Rogers' adopter categories is likely to be most at risk of harm. Psychonauts are thought to be more educated than other users and although they are risk takers they adopt strategies to mitigate these risks which individuals with less education may take; they have an 'extensive knowledge' about the drugs they take (Gonzalez et al, 2013: 338, 339). Innovators will adopt a technology when it is at a very early stage of development and therefore they are likely to encounter more risks (Nokelainen and Dedehayir, 2015). Although harm reduction is important for innovators, the potential for harm in this group is high in comparison to later adopters due to the early experimentation. Innovators play a 'pivotal role' in the diffusion of emerging NPS products and are therefore an important prevention target (Boyer et al, 2007: 1).

According to Rogers' theory, innovators tend to be from higher social status groups (Diaz-Rainey and Ashton, 2015). In relation to NPS, innovators will have and understand high levels of technical and chemical knowledge. Again, importantly in relation to NPS, innovators are described as having the closest contact with scientific sources (Jin, 2013; Lin and Wu, 2013). Psychonauts know exactly what a product contains and use more precise methods of dosing, differing 'considerably' from other NPS users such as those taking SCRA or BZP who may not be aware of the exact composition of their products (Gonzalez et al, 2013: 336, 338). The National Assembly for Wales Health and Social Care Committee (2015: 24) defined 'psychonauts' as individuals who 'actively experiment' with 'mind altering chemicals' and whose pattern of use involves taking substances to exact measures and recording their experiences and actively sharing them online and engaging in online discussions about experiences. Stogner also used the term 'psychonauts' to describe 'avid drug users' who have a wide drug knowledge and experiences (2015: 2).

Innovators could also be applied to the term used by O'Brien et al: 'cyber-psychonauts'. These individuals existed as 'a post-mephedrone, predominantly NPS-using version of the traditional psychonauts... with the intention of subjectively exploring their effects' (O'Brien et al, 2014: 3).

They are committed to harm reduction through responsible and safe NPS use and define themselves as ‘responsible’ and ‘knowledgeable’ through researching online the purity, dosage and health risks of a product (O’Brien et al, 2014: 3). Cyber-psychonauts use NPS in a range of social settings, but usually in their own home alone to fulfil their main motivation of use which is to experiment with the chemicals and explore drug effects. They are then able to report findings online by sharing their ‘drug journeys’ and knowledge with the other forum members or NPS community (O’Brien et al, 2014: 3).

Orsolini et al (2015b: 303) and Davey et al (2015) used the term ‘e-psychonauts’ to describe individuals as key contributors to online forums and are described as ‘online drug enthusiasts’ who are well-educated with high levels of ‘pharmaceutical/chemical/psychopharmacological’ knowledge. Additionally they have an enthusiasm to experiment with and a knowledge of unknown chemicals and combinations. These individuals could be seen as innovators. Innovators are described as being ‘pioneers’, ‘venturesome’ and are ‘obsessive’ about new ideas (Jin, 2013: 1906; Diaz-Rainey and Ashton, 2015: 107). Relating to NPS, they are likely to be ‘obsessive’ and ‘venturesome’ about discovering and synthesising new products with minimal side effects, desired psychopharmacological effects or novel effects.

In the study by Van Amsterdam et al (2015), ‘pioneers’ also appear to possess the characteristics of innovators. These were the participants who actively sought out new NPS products online. Similarly, Żukiewicz-Sobczak et al (2012) described ‘experimenters’ who have an interest in the action of different NPS products and experiment with a range of NPS products out of curiosity and they can also be seen as innovators.

In conclusion, of all the DOI adopter categories, innovators appears to be the most appropriate to the different NPS user groups. The innovator adopter category can be seen to represent a variety of terms used in the literature but ‘psychonauts’ appears to be the most popular. In identifying characteristics of innovators, the theory appears robust in relation to NPS. Aspects of Rogers’ theory however may not be applicable. For example, NPS innovators are unlikely to represent 2.5% of the social system. Instead, they are likely to only represent a ‘handful’ of individuals and the appropriateness of the term is related to their behaviours, beliefs, values and strategies which they adopt.

Early adopters

Early adopters are key to the diffusion of an innovation. They are the group most commonly observed and they play an important role in increasing the confidence of potential users to adopt an innovation.

They comprise approximately 13.5% of the population (Kardong-Edgren, 2008) and if they adopt an innovation, it is more likely to spread through a system (Bertrand, 2004). In relation to NPS, early adopters can be seen to be forum moderators or administrators and ‘experienced members’ of online drug forums. Early adopters of NPS can be seen to fit Rogers’ theory in that they are offered privileges such as access to other forums, private chats or specific content; their advice, recommendations or warnings are seen as trusted and validated (Davey et al, 2015).

Early adopters must have successful experiences in their personal history to be early adopters with social leadership (Tola and Contini, 2015). The postings of early adopters of NPS help to inform new members or ‘lower ranked’ members (Davey et al, 2015: 391). Davey et al (2015) also explained that some experienced members on forums would frequent a number of forums therefore increasing their recognition. If a substance is used by ‘socially respected’ individuals this is likely to make others more curious to try the substance than if it was used by socially isolated individuals (Stogner, 2015: 2). Whilst experienced members were likely to be the first to report experimenting with new substances, if they deemed the substance risky or ‘impure’ they would stop use (Davey et al, 2015: 391). In relation to NPS, early adopters will adopt a product and if they respond positively to it, then later adopters are more likely to also adopt. The opinions of early adopters act as guidance for other members in a similar way to that of opinion leaders.

Early adopters tend to be male, younger, of higher socio-economic and occupational status and highly educated (Rogers, 1962; Greer, 1977; Atkin et al, 2006; Meade and Islam, 2006; Ward, 2013; Greaves, 2014; Shu-Chu, 2014). This description appears to be applicable to NPS users more generally and may not relate specifically to early adopters. However in the literature, an early adopter can be identified as a specialist dance ‘clubber’ (Brandt et al, 2013; EMCDDA and Europol, 2013; Moore et al, 2013; Sedefov et al, 2013) or gay men, who proportionately report a higher use of substance use than the general population (Moore et al, 2013; Sumnall et al, 2013). In addition, bodybuilders as a group contain both innovators and early adopters; for example, gammahydroxybutrate (GHB) was first used by bodybuilders to ‘build muscle and strip fat’ before it was used as an anti-ageing product, and before diffusing as a recreational drug on the ‘party scene’ (Sumnall et al, 2013: 90). They are, however, frequently overlooked in NPS research. Sumnall et al (2013) also described the group as both ‘innovators’ and ‘early adopters’. The early adopters are also defined as the ‘recreational and club/party goers’, who are mainly young adults or adolescents who ‘binge use’ at weekends in clubs or festivals with a number of substances (National Assembly for Wales Health and Social Care Committee, 2015: 23-24).

Early adopters of NPS appear to have different identities online and offline. Online early adopters exist as forum moderators or administrators and ‘experienced members’ who have extended access

to forums and provide advice to other users. Offline early adopters exist as clubbers and the extent to which these two identities overlap is unknown but is expected to be highly likely. Innovators and early adopters are the two key NPS user groups to analyse and there is little or no reference in the literature to the three remaining adopter categories: *early majority*, *late majority* and *laggards*. However, it is still necessary to speculate as to their identity among NPS users and how applicable the DOI is to NPS diffusion.

Early majority

The early majority are persuaded to adopt an innovation by innovators and early adopters; but they take longer to make a decision (Haider and Kreps, 2004; Jin, 2013; Nokelainen and Dedehayir, 2015). They are willing to adopt change (Doyle et al, 2014) and have good interactions with the rest of the social system. Early majority adopters hold above average socioeconomic status, but do not hold opinion leadership positions in a social system (Rogers, 1962). In relation to NPS users, this group is likely to be users who frequent online drug discussion forums to find and discuss information about new products. The early majority will adopt an innovation before the average individual and typically comprise one third of the social system (Rogers, 2003). Diffusion occurs at a slow pace until the early majority and ‘then snowballs’ (Robertson, 1967: 16) through into the late majority and the laggards. Barnard et al described a group of users as ‘intermittent users’ (2014: 91), this can be identified as those who did not see their NPS use as an ‘integral part’ of their identity and availability played a more important role than time spent sourcing information and NPS products. Their choice of products was driven by curiosity having observed the effects of an NPS product on a friend to stimulate use. This group could be identified as the early or late majority users. In addition, the early and late majority can be defined as ‘poly-drug users’, who have a traditional illegal drug use history and add NPS products to their ‘repertoire of drug use’ (National Assembly for Wales Health and Social Care Committee, 2015: 24).

Late majority

The late majority are similar to the early majority in characteristics and also in that they are not leaders (Gayadeen and Philips, 2014). They adopt new ideas later than the average members of a social system. They are a more traditional group and they wait until they can confirm adoption is the right choice (Rogers, 1962). Late majority adopters are described as having ‘below average social status and financial capacity’ and therefore are more ‘economically conscious’ and will adopt when the risks are low (Lin and Wu, 2013: 243; Nokelainen and Dedehayir, 2015; Tola and Contini, 2015). They attach a lot of importance to the opinions of others in the social system; they are especially reliant on the acceptance of an innovation by early adopters (Roda et al, 2003; Nokelainen and

Dedehayir, 2015). The late majority comprises approximately one third of the social system (Hu, 2013). In relation to NPS users, the late majority group may not be users of online drug forums, or they may be fringe members in that they do not post their experiences but they may still use the forums to assess experiences by other members and evaluate their willingness to also adopt the product. For offline identities, the late majority may include vulnerable NPS user groups who adopt an NPS product through economic pressure. Research in the area of DOI focuses on early adopters and innovators and there is little empirical evidence regarding the late majority and laggards (Jahanmir and Lages, 2015).

Laggards

Laggards are the last group to adopt an innovation; they are typically the last 16% of the social system (Roda et al, 2003). They are highly sceptical and suspicious and resist the adoption of an innovation until it is absolutely necessary or they have strong evidence (Jin, 2013; Doyle et al, 2014; Diaz-Rainey and Ashton, 2015). They are described as a cautious, conservative group of individuals (Roda et al, 2003; Nokelainen and Dedehayir, 2015) who are highly resistant to change and focused on traditions (Collins et al, 2015; Moldovan et al, 2015). Laggards have the lowest socioeconomic status and therefore are more price-sensitive and are the oldest of all adopter groups (Jin, 2013; Diaz-Rainey and Ashton, 2015; Eder et al, 2015). There are challenges in recognising which NPS user group could be identified as laggards, this group may relate to SCRA users who belong to vulnerable groups such as the homeless. However, it is unlikely that the reason for their delay in adopting a product would be 'tradition'. Their involvement in the social system is limited to contact with only friends and family and they show no opinion leadership (Rogers, 1962). Laggards are usually 'isolated' individuals who have little or no external social interaction (Tola and Contini, 2015: 496) and they have the least exposure to the communication channels (Lin and Wu, 2013). In relation to NPS, this is likely to be NPS users who do not involve themselves in the online forums to discuss NPS products.

In conclusion, Rogers' DOI appears appropriate in identifying certain adopter categories. In particular, the term 'innovator' appears to be an accurate description for 'psychonauts' and their characteristics. The term 'early adopter' also appears appropriate in recognising influential individuals online on online forums or offline. The different size of the categories, however, does not appear to be an accurate portrayal of the different NPS adopter categories. Furthermore, the positioning of vulnerable individuals using NPS as 'laggards' or the 'late majority' may not truly represent the length of their innovation-decision process. People in low socioeconomic status groups may use NPS early in the diffusion process because they are readily accessible and they do not have

high levels of economic capital. If they are also existing drug users then they may also have ready contact with dealers or suppliers.

Social System

The final element of the DOI is the social system. Diffusion occurs within a social system: it is ‘a set of interrelated units in jointed problem solving to accomplish a common goal’ (Rogers, 2003: 476). The sharing of a common problem binds the social system together (Rogers, 1983). The social system exists as a network of individuals with shared social norms (Sundstrom, 2014). The members of a social system may be individuals, informal groups of organisations and two key actors in this social system are opinion leaders and change agents (Rogers, 2003) and they will be the focus in the diffusion of NPS. Initial communication is generated from change agents and opinion leaders (Barrette, 2015).

Change agents

A change agent is defined as ‘an individual who influences clients’ innovation-decisions in a direction deemed desirable by a change agency’ (Rogers, 2003: 473). For example, vendors and suppliers who can influence innovation decisions (Harrison and Waite, 2006). In the NPS market, NPS retailers may be change agents if they influence innovation-decisions in the desirable direction of promotion and sale of NPS products.

Diffusion, and the rate of diffusion, of innovations is likely to have occurred because of the influence of change agents (Miller and Garnsey, 2000; Rogers, 2003). Change agents understand the importance of both interpersonal communication in encouraging or dissuading adoption of an innovation and also external communication (McQuarrie, 1989; Hung et al, 2011). To have this success, change agents must have membership within the social system of those they are trying to influence (Milner et al, 2005). This appears to be especially appropriate in relation to NPS; in the online community, change agents must be, or at least appear to be, integrated into the social system for their views on NPS to be acknowledged. However, Sundstrom stated that change agents typically do *not* belong to the social system but they share certain characteristics with potential adopters which allows for a degree of homophily to help ‘bridge the trustworthy or safety credibility gap’ (2014: 90-91). If a change agent can be perceived as a knowledge expert, they will promote confidence and ‘competence credibility’ (Sundstrom, 2014: 90-91). They must also effectively communicate to minimise the perceived complexity, highlight compatibility and accentuate the perceived benefits of an innovation (Karakaya et al, 2015).

A change agent will actively provide positive product information to potential adopters to encourage adoption (Ram, 1989). In relation to NPS, this will involve providing information to potential adopters on benefits, compared to other products, and the risks of different NPS products. Change

agents possess high levels of knowledge about the innovation and they act as the link between the change agency and the social system and must gain the confidence of both (Dorner, 2009). However, they may also attempt to slow the adoption and diffusion process if certain innovations have undesirable effects (Haider and Kreps, 2004). In relation to NPS, change agents must gain the approval and acceptance of members of the social system. They must be convincing in their delivery of information about a product to the extent that potential users are convinced to adopt, or at least trial it. Change agents who are successful will work closely with opinion leaders to diffuse innovations (Sundstrom, 2014).

Opinion leaders

Opinion leadership is defined as ‘the degree to which an individual is able to influence other individuals’ attitudes or overt behaviour informally in a desired way with relative frequency’ (Rogers, 2003: 475). Opinion leaders advocate, stimulate or support the diffusion of adoption of different innovations (Arts et al, 2011; Barrette, 2015) through various communication channels. They have the greatest influence on the acknowledgment and adoption of products in the diffusion process (Cho et al, 2012).

Although Sumnall et al (2011) described chemists as ‘opinion leaders’, in relation to NPS, opinion leaders are likely to be forum moderators or active participants in NPS forums in that they provide information or advice about innovations to other forum users. They are likely to be found in the ‘early adopter’ category (Gayadeen and Philips, 2014; Eder et al, 2015) and share similar characteristics with this group. Determining whether innovators can be classed as ‘opinion leaders’ has been debated in the literature. Innovators may not be respected by other members of a social system (Rogers, 2003); as opposed to being opinion leaders, they may be perceived as being ‘deviants’ from the norms of the system (Yamamoto, 2015: 188). Although innovators may not be influential, in the way that early adopters or opinion leaders are, they may ‘set the stage for change’ by demonstrating new ideas to opinion leaders (Rogers, 1962: 193-194).

Opinion leaders are the key targets for change agents (Rogers, 1995) and online NPS vendors would target opinion leaders as they are ‘socially influential individuals’ (Griffiths et al, 2010: 951). Credible statements, especially subjective evaluations, from opinion leaders can have a powerful effect on the opinions of individuals (Sobell, 2016). Opinion leaders use their influence to speed up or slow down the diffusion of an innovation (Greer, 1977). They will provide ‘measured appraisals’ of new innovations to encourage diffusion (Dearing and Singhal, 2006: 23) and address misconceptions (Seebauer, 2015) which reduces uncertainty for potential adopters. ‘Expert’ opinion

leaders are seen to exert influence through authority or status and 'peer' opinion leaders are seen to exert influence through their representativeness and credibility (Greenhalgh et al, 2004: 602).

Opinion leaders show a higher number of 'outside-the-group' or external information sources about new innovations, such as the mass media or change agents, than other members of the social system (Becker, 1970; Feder and Savastano, 2006). This 'closer contact' will enable them to be the first to learn about new ideas to pass onto other members of the social system (Abraham and Hayward, 1985: 4-5). The role of the mass media in affecting the diffusion of an NPS product in the early stages of its diffusion appears to be small. Nevertheless, opinion leaders may be affected by the mass media or external influences in relation to keeping up with new NPS legislation.

Opinion leaders must 'belong' or have 'good access' to the groups that they are influencing in order to be more successful (Greer, 1977: 509; Milner et al, 2005: 909; Barrette, 2015: 137) and must be 'socially accessible' (Cronje and Moch 2010: 26). NPS opinion leaders need to strike a balance between conveying their extensive knowledge with appearing approachable and believable to other NPS users. Online opinion leaders, which is appropriate in relation to NPS, are characterised by their involvement, high level of knowledge and their innovativeness (Ma et al, 2014). In order to establish opinion leadership, individuals need to provide suggestions or advice (Ma et al, 2014) through forum posts more frequently than other members of the social system (Tsang and Zhou, 2005). An NPS opinion leader will frequently post on forums regarding their recent experiences with a product or simply to provide advice or information concerning a product.

Socioeconomic status or general social status is not important in an online environment; expertise, experience and credibility are more important opinion leadership requirements (Park, 2013). This is likely to be relevant for NPS, socioeconomic and social status is unlikely to be revealed on anonymous online forums and therefore NPS expertise will be more important. Opinion leaders are different to change agents in that they do not represent commercial interests and therefore their opinions are seen as having more credibility and influence (Tsang and Zhou, 2005). This is especially relevant for the diffusion of NPS; a positive report of a product must be viewed as trustworthy and credible.

Finally, for opinion leaders to have an influence over other adopters' decisions to choose a product they must themselves, be convinced by the product and convey this conviction (Puska et al, 1986; Deroian, 2002). In relation to NPS, if an opinion leader has had a negative experience of a product, perhaps through experiencing negative side effects, they are unlikely to convey a positive attitude towards a product. This is an example of how an opinion leader differs from a change agent.

In conclusion, the identity of change agents in the social system of NPS users is likely to be that of retailers who promote particular NPS products. Opinion leaders may also be retailers in that they provide information and advice about innovations to others. But they are also likely to be experienced NPS users who post frequently on online forums whose views are acknowledged and respected. The existence of opinion leaders and change agents does appear appropriate in the NPS market.

Limitations

Limitations are defined as exposing ‘the conditions that may weaken the study’ (Bloomberg and Volpe, 2016: 147). The method used to conduct this study has limitations. A key limitation of a critical analysis as a methodological method is that it is not based on an explicit, specified method and therefore there are not clear, discrete steps which need to be implemented.

A challenge when undertaking this critical analysis was the volume of appropriate articles for the analysis which included 191 articles relating to the DOI theory and 233 articles relating to NPS. However, the process of extracting data was more straightforward. Stage two of the study was possibly the most challenging stage which involved hypothesising how NPS could be applied to the theory, as this application had not taken place previously. Whilst some areas were straightforward to hypothesise, for example identifying the relative advantages of different NPS, other aspects were more challenging such as identifying change agents or opinion leaders. Additionally, whilst many articles covered topics relating to various relative advantages such as legality or lack of detection on drug tests, there was only a small number of articles which addressed different user groups of NPS other than innovators or early adopters. Consequently, whilst some areas of the applicability of the theory to NPS could be critically analysed effectively, such as innovators in the area of NPS, conversely critically analysing the theory in applying the concept of complexity to NPS was more challenging.

Conclusion

To conclude, Rogers' DOI does appear appropriate in understanding the diffusion, and rate of diffusion, of NPS. For an NPS product to successfully diffuse, it will need to have enough perceived relative advantages, low levels of complexity, high levels of compatibility, trialability and observability. The relative advantages of a product appear especially appropriate in terms of psychopharmacological effects, lack of unwanted side effects, accessibility and legality. These benefits will need to be communicated effectively through communication channels either providing awareness through the media channels, or more importantly, interpersonal channels such as friendship networks or online forums to persuade an individual to adopt the product. Change agents, but possibly more importantly opinion leaders, will need to convince individuals that they are credible and have the experience to influence potential adopters to adopt the product. Finally, NPS users exist in different adopter categories and their innovation-decision processes will differ depending on how long it takes them to adopt an innovation. The existence of innovators and early adopters appears especially appropriate to NPS diffusion.

However, certain aspects of the theory are not as appropriate in explaining the diffusion of NPS. For example, it is challenging, although it can still be done, to incorporate the role of the internet to the diffusion of NPS where it has played an important role. It is difficult to apply the internet as a mass media channel or as an interpersonal channel. Additionally, identifying NPS user groups as belonging to the different adopter categories was challenging. The latter three adopter categories, early majority, late majority and laggards, were not well explored in the literature. Therefore they did not offer the same foundation in which to apply NPS user groups to as did the first two adopter categories, the innovators and early adopters. Furthermore, the theory does not allow for external circumstances. For example, it may be the case that an NPS product diffuses because it has become a trend. This could be seen as part of the 'observability' aspect or effective communication through the communication channels but the product may not offer any relative advantages over another product which would explain its diffusion.

The findings of this critical analysis were used to inform the interview guides for the interviews with the retailers (Study Two), the professionals (Study Three) and the questionnaire and CBC (Study Four). These findings will now be explored.

Chapter 5: Study Two - Interviews with NPS Retailers

The interviews with NPS retailers formed the second study in the thesis. In total, three interviews were conducted with retailers from the UK (R1, R2 and R3). The PS Act which was introduced during the interview period was unsurprisingly a focus of the interviews. Although specific questions were asked about the Act, the retailers referenced it frequently throughout the interviews. The interviewees were asked questions in relation to Rogers' DOI and questions relating to NPS retail. This chapter begins by exploring the background of the interviewees, perceptions of NPS use and their retail practice including harm reduction. The perceptions of the interviewees of the PS Act are then explored. Finally, the findings from the interviews are applied to Rogers' DOI.

Retail Practice

Demographics of interviewees

The interviewees were all male and ranged in age between 28 and 46. One retailer began by selling homemade extracts of salvia divinorum on 'basic' websites before diversifying over a period of time to the most recent version of their website which sold 'all the popular products'. The website first sold 'herbal highs', which the retailer defined as 'strictly plant-based products in capsule/liquid form', before selling 'Spice' for the first time in 2009 as the first big-brand product. Another stated that they had been a cannabis seed retailer, which was a predominant part of their current website, and had begun selling NPS in 2009 as their suppliers began to sell them. The third retailer originally began as a wholesaler selling raw materials to headshops as opposed to personally selling branded products.

The three paths taken by the interviewees in becoming online NPS retailers offered interesting variations. This is likely to have played a role in the range of views relating to NPS retail conveyed during the interviews. For example, the interviewee who had a background in wholesale was able to offer an insight into the NPS market from this perspective. This provided an interesting contrast to the two other interviewees whose background in NPS comprised website retail. Additionally, 2009 appears to have been an important year in which NPS online retailers began selling products such as 'Spice' and other NPS. This also highlights the importance of the suppliers used by the retailers in influencing what products were sold on their websites.

Perceptions of the prevalence of NPS use

The NPS market was perceived by the interviewees as having grown in recent years. For example, R2 perceived that, based on conversations with other retailers, the market had been growing throughout the six-year period leading up to the introduction of the PS Act. The interviewees distinguished between different components of the market and perceived that there were two distinct parts. Firstly, the sale of branded packets sold in headshops and online shops which they discussed as ‘legal highs’, and secondly, the ‘research chemicals’ which they defined as being in ‘pure form’ and being sold online. The retailers interviewed stated that they sold both on their websites. The ‘legal high’ market was perceived as making up the largest market share. It was interesting that the retailers distinguished between the two different NPS categories as this was not raised by any of the professionals in their interviews (Study Three). This distinction is likely to be unique to NPS online retailers in contrast to headshop owners who would be more focused on selling the ‘legal highs’.

Retailers’ websites and sales

The sale of NPS appeared a profitable market for retailers who appeared to be selling mainly ‘research chemicals’ to a largely European market. One of the interviewees suggested that their website turned over £300-400,000 in 12 months. R1 stated that each month the website would have 25,000 sessions, 18,000 users and 130,000 page views. In revenue, the website generated approximately £30-40,000 a month. R2 explained that up to 200 orders a day were received and approximately 1,000 visitors a day. Whilst one retailer referred to another individual involved with running the website, the other retailers did not indicate whether they managed the websites alone or if they had employees. The sale numbers would suggest that the businesses were not managed alone.

In terms of the global market and where their customers were based, one retailer stated that their website mainly sold products to countries within the EU as the markets within these countries were growing rapidly. They perceived that Germany, Sweden and the UK had the biggest markets. The retailer also stated that they never shipped to the USA because of their strict drug legislation, which would suggest that legislation had an impact on the nature of retail. However, this seemed to vary between retailers as R3 stated that they mostly sold their products overseas, as opposed to the UK, and this included the USA. Most customers for R1 were from the UK followed by the USA. It was interesting that the two retailers who did sell to the USA had a high numbers of US customers. Additionally, two of the retailers had high levels of UK sales whereas the third retailer stated that the majority of their sales were overseas and not UK based.

The figures relating to website visitors and monthly orders on the websites seem to highlight the role of the internet as a source for purchasing NPS. It is unclear however, as to what percentage the sales

were for end use or for social supply.

Perceptions of the most popular NPS

Economic viability and customer or personal feedback influenced their decision of the retailers as to which products to sell on their website. Economic viability related to the idea that a product could not be too expensive to manufacture as the cost would be passed on to the customer. Therefore it would be unlikely to sell. Judgments on popularity included consideration of which products the retailers personally thought were good, in terms of psychopharmacological effects based on their own testing or through the testing by customers, whilst acknowledging feedback from their customers. Additionally, availability from wholesalers and manufacturers played a role.

All the retailers stated that SCRA were the most popular NPS sold on their website with a range of brands and compounds being named. In terms of brands, these were MMB-CHMINACA, exodus damnation, herbal haze (mentioned by two retailers), black mamba, Pandora's box. In terms of chemicals, these were 5F-AKB48, 5F-PB-22, THJ-018. R2 stated that stimulants and ketamine analogues were popular among populations who enjoyed use of these products, although they did not have the widespread appeal of other NPS products. Popular stimulant chemicals mentioned were methiopropamine (MPA), ethylphenidate and 3-FPM. The latter two substances were described as having become popular following the control of MPA in the UK under a TCDO. This appears to illustrate the 'cat and mouse' UK NPS policy situation. China white, dust till dawn and gogaine were also mentioned as popular stimulant brands.

The popularity of SCRA products was anticipated as this NPS category is one of the most popular in the UK. However, their popularity on the retailers' clearnet sites was surprising as there is focus on the use of these products by particular groups such as the homeless population, who are likely to access these products previously through headshops, or the prison population (Blackman and Bradley, 2016). It was noticeable that no retailers mentioned mephedrone as a popular product although MPA and ethylphenidate were mentioned which were regarded as being similar to mephedrone.

'Responsible' retailing and role of retailers as harm minimisation agents

All the retailers emphasised the position that there were in as NPS retailers in being restricted by previous legislation to be harm minimisation agents; although they did offer different harm reduction practices. The retailers also had influence in the products they stocked and the minimisation of potential risks.

R3 emphasised the restrictions placed on them by (previous) NPS sales regulations and they explained that it was ‘barely possible’ to act as a harm minimisation agent. For stocking products, R2 explained that if they heard negative stories, including hospitalisations, about a product in another country, this would influence their decision to not stock a product:

‘it’s a case of selling the products that are less likely to cause problems’ (R2).

Interviewees were asked about their perceptions of irresponsible retailing and there was a perception that irresponsible retailers would not care about harm minimisation practices. The retailer explained that:

‘Irresponsible retailing would include actively promoting the most addictive products on the market, ‘upselling’ more addictive products at the point of sale, aggressive offers that may lose you money initially with the hope of nurturing an addiction in a long-term customer... [an] irresponsible retailer doesn’t care about the people on the other end of the transaction’ (R1).

Another retailer, again as expected, wished to distance himself from association with irresponsible retailers through stating that they themselves would not sell addictive products as part of a promotion. R3 stated that:

‘We’ve got to sell it on the fact that we think you’re not going to take it. For legal reasons’ (R3).

R1 stated that there had been occasions where they had broken the law in order to offer advice to a customer. For example, one customer had contacted them for advice about the properties of ayahuasca in helping their depression and they responded with advice. This again was another example of the interviewed retailer positioning himself as a responsible retailer and this was evident throughout the interviews.

The retailers all wished to distance themselves from irresponsible retailing, which they perceived as having caused the PS Act, and be portrayed as responsible retailers. However, some of their retailing practices could be seen to be irresponsible practices. For example, two of the retailers did not test anything either themselves or through their customers; they relied on what retailers were already selling, customer feedback and what was available from their supplier to assume that a product was safe.

The UK Psychoactive Substances Act

The interviews took place over a five-month period between February and July 2016 and during this time, the PS Act was introduced. This time period is important as when the first interview took place in February the timing of the implementation of the Act was unknown. However, by the final interview in July the Act had been in place for two months.

Perceptions of the effectiveness of the Act

Unsurprisingly there was a negative perception of the PS Act and its effectiveness among all the retailers especially in terms of increasing harm. However, the manner in which they conveyed their negative perception was not to the same extent as a number of professionals (Study Three) which was interesting. The Act was described as:

‘a bad piece of legislation in general because it won’t reduce harm’ (R2), ‘bit of a knee-jerk reaction’ (R3) and a political ‘emotional reaction’ (R1) to say ‘look what we’re doing for the population’ (R3).

In terms of effectiveness, R2 stated that the UK Act would not eliminate NPS use. The interviewees thought that the market would go underground and suggested that while the Act would be effective in eliminating the visible side of the market, it would be ineffective in reducing harm. There was the perception that:

‘This Act has never been about reducing harm’ (R1).

The interviewees perceived that the Act would increase harm through the increase in use of NPS products produced and supplied through the illicit market with decreased purity and quality and the interaction with the criminal market. R3 also perceived that the change to the illicit market would end the ‘accurate labelling’ of ingredients on packets by retailers. This would increase harm as individuals would be unaware of the contents of what they had taken:

‘it will go underground... it might actually cause more harm than good because then it’s open to the sort of shadier characters and they’re going to start mixing it with dodgy products... I mean at the moment all the powders, chemicals and the herbal incenses they have to be labelled exactly what’s inside them. Cause it’s underground, no one’s going to really know. If they do get into trouble with taking some of the stuff and they get taken to hospital they won’t know what chemicals they’ve actually taken... it’s basically just giving a licence now for the criminals to run the legal high bit or should I say now the illegal high business’ (R3).

The effectiveness of the Act was also questioned in relation to the PS Act in Ireland and the underground market which emerged following the ban of mephedrone in the UK. In addition, the policing and financial challenges associated with the Act were also recognised. The definition of psychoactivity was criticised by the interviewees who described it as a:

'poor definition' (R1), a 'very, very vague definition' (R3) and 'not a scientific or evidence-based definition' (R1) but instead a legal definition.

R3 suggested that it:

'seems like something they've [the government] just sort of concocted. They're not really sure what to call them or how to really legislate it. They've just put an umbrella description over it' (R3).

It was noticeable that the retailers reflected on the effects of the Act for their customers and how it would affect them. The retailers all stated how they would adapt following the Act, highlighting their existence as businessmen, but they did not give the impression of anger following its implementation. Indeed, one interviewee described their feelings towards the Act as being 'half glad' because the NPS business was very stressful and because of its lucrative nature it would have been:

'so hard to walk away from without being pushed' (R2).

Perceptions of the motivations behind the introduction of the Act

Motivations for introducing the PS Act were perceived as being the appeasement of the media and the inadequacy of current NPS legislation, which was also recognised as a motivation by the professional interviewees (Study Three). The government was perceived as failing to deal with retailers replacing a banned substance, sometimes within a week. This led to a '*hopeless task*' for the government who did not have existing mechanisms to control it:

'there was no way they were ever going to keep up with the 'cat and mouse game' basically' (R2).

The retailers also acknowledged that the Act may have been introduced to make the general public feel safer. However, because the demand for NPS was there, the Act would move the market underground or online.

Possession offence aspect of the Act

R3 spoke of the possession offence aspect of the Act and stated that it was ‘fine’ but ‘weird’ as it implied that it was acceptable to take NPS but they would prosecute the individuals selling the substances. They perceived that the government were:

‘already admitting defeat in a way because they know they can’t stop it... they’re already criminalising a load of the population for illegal drugs. You know imagine how much the courts are going to be chock-a-block, if they actually said we’re going to do you for possession as well. So yeah, that’s probably more a financial decision, realising they can’t actually really police this and enforce it at the end of the day’ (R3).

Perceptions of diffusion following the introduction of the Act

All the interviewees agreed that following the introduction of the Act, NPS use was likely to go underground and therefore diffuse further into the normal underground market for drugs. R1 perceived that this would be the practice of the ‘overwhelming majority’ of NPS users. R2 stated that they felt sympathy for their customers who would now have to ‘risk importing from abroad or buying off street dealers’ and the associated risks. However, R2 perceived that it was likely that following the introduction of the Act, there would be vendors in European countries still accepting orders from UK customers. For other NPS users, there was the perception that they would revert to traditional illegal drug use. If NPS prices increased because of the decrease in availability then users may perceive NPS as having lost their relative advantages over traditional illegal drugs. This would lead to an increase in the sales of traditional illegal drugs.

One of the interviewees suggested that the users who had been making a deliberate decision to use NPS because of their legal status would be likely to stop use owing to the legal status change. Conversely, R1 perceived that a large number of users would continue to use NPS because they had other benefits and used the example of products, in their opinion, being stronger than natural cannabis. Finally, online forums were seen to be likely to play a role in affecting the popularity of different products but additionally users:

‘might just take what they can get rather than having that big choice’ (R2).

One retailer perceived that the development of the NPS market following the PS Act would be determined by the location of the suppliers and the legislative market in their country. They suggested that the innovation of NPS products, both in wholesale and retail, would be driven by the availability of products in Europe, in particular Spain. This was owing to a large number of retailers being based

in Spain as it was one of only a few EU countries to not have special NPS legislation. This relates to the idea that if there is proactive NPS legislation in a country then a supplier will have to have higher levels of innovation to respond to a government banning a product. Without this ‘cat and mouse game’ there is not an incentive to be innovative with new NPS products. This will lead to a narrowing of the NPS market which will affect the availability of NPS in countries where there is prohibitive NPS legislation, such as the UK.

Since the interviews, through correspondence between the retailer and the interviewer it was established that one of the retailers had stopped retailing in NPS. It is unknown whether or not the other interviewees left their positions as NPS retailers. One of the websites of the retailers is still in existence but the website has returned to only selling cannabis seeds. Another website is still in existence selling NPS although it is stipulated that products sold are ‘ban exempt research chemicals’. The third website has closed.

In conclusion, the retailers emphasised that their customers were likely to continue to obtain NPS because they enjoyed the products and therefore would choose to source through whatever means necessary. This is unsurprising given that the interviewees were retailers who were selling these products. However, they also acknowledged that the Act would affect the relative advantages associated with NPS use and their predictions for the diffusion of NPS following the PS Act highlighted that they were aware of how the Act would affect their businesses. Furthermore, the findings of the research relating to harm and harm minimisation are an important consideration for public health.

This part of the analysis will apply the results of the interviews to Rogers' theory to assess its appropriateness. Rogers' DOI comprises four sections: the innovation itself, communication channels, time and the social system.

The Innovation Itself

Questions were asked relating to Rogers' DOI theory. For the innovation itself aspect of DOI, the interviewees spoke mainly about factors which could be interpreted as relative advantages. However, both trialability and compatibility attributes were suggested by the interviewees.

Trialability

Discussions related to trialability concerned the different practices offered by the retailers to trial a product which included contacting their mailing lists to advertise discounts on their websites and offering bulk sale discounts. All the retailers acknowledged that offering a discount would have an effect on sales of a product suggesting that this market tactic was effective, although the extent to which they used these practices varied.

The retailers decided which products to sell at a discount as to whether a product had been mentioned in the media (this is explored later in the chapter) or if a product was about to be banned by the government. R2 explained that they offered discounts on the website but not to the extent of other websites as they did not think that they needed to, as the website was 'reassuringly expensive'. Similarly to other non-NPS businesses however, if the website of a competitor was selling a product at a noticeably cheaper price this may encourage the lowering of price to prevent losing business. However, they would not price match, as customers would know that products sold on their website would be better quality. Additionally, their high level of customer service would mean that there was no reason to price match. In describing their products as 'reassuringly expensive', the retailer appeared to be distinguishing himself from other retailers and appearing more reliable and responsible led to higher prices.

Compatibility

In terms of compatibility, this related to the route of administration which one retailer (R1) recognised as representing a practice which was compatible with the current practice of the user. However, mainly compatibility related to marketing, through both brand names and packaging, which was unsurprisingly acknowledged as important to diffusion. There was a difference in opinion on the importance of the marketing of NPS products. Whereas two of the retailers saw the branding of a

product through name or packaging as playing a potentially key role in why one NPS would diffuse over another, the other retailer gave the impression that their customers would be unlikely to be influenced by branding.

R1 stated that chemical vendors would implement marketing strategies including promoting new products as *the* replacement for a banned substance. However, the names of a product were seen as the most important aspects of marketing by the retailers. R1 gave the example of:

'years ago being sent a ziplock bag and cardboard label stapled on, with a smiley face and the product name 'Pikey Dust'. Let's just say that was an obvious 'no', despite it being the exact same chemical that everyone else was pushing' (R1).

This would suggest that the products arrived from their stockists with existing names as opposed to the retailers creating the names themselves, although it is unknown whether this practice extends to all retailers. R3 stated that, in their opinion, the popularity of herbal haze and exodus damnation (popular SCRA brands) related to the names and packaging looking appealing. They perceived that:

'sometimes the name itself will sell rather than actually what's inside' (R3).

The name of a product also had an effect on popularity in terms of website logistics. One retailer gave the example of a sale involving the product 'Voodoo' (a SCRA brand) which was not successful due to the alphabetical order on the category page. In terms of packaging, there had been a lot of marketing used in the display of NPS products to make them 'look nice and flash' (R3). The popularity of china white (a stimulant brand) was attributed by one of the interviewees to the packaging. The marketing of products may also play a role in the curiosity of individuals. One interviewee suggested that:

'some people are also open to new experiences simply because they are new and exciting' (R1).

R2 suggested however, that the importance of marketing only extended to customers who purchased the 'legal highs' as opposed to the 'research chemicals'. The retailer gave the impression that marketing did not apply to their customers using 'research chemicals'. This could be perceived as a deliberate branding technique to dissociate the 'research chemicals' from the 'legal high' products which had bright packaging and appealing names.

In conclusion, the compatibility and trialability components of the DOI theory were found to be applicable to the diffusion of NPS. The marketing of a product was perceived as being important in the diffusion of a NPS product in terms of compatibility. The retailers all confirmed that offering a discount on a NPS product would impact the sale of the product. However, the reasons given for

offering the discount related to practical reasons affecting supply such as stock or legislation banning the product; reasons did not relate to the product itself. Whilst one interviewee acknowledged the positive effect a discount would have on a product, they implied that other factors such as customer service and trust were more important for an individual to purchase a product. Their comments on products being 'reassuringly expensive' question the importance of price, which will now be explored. The comment also draws attention to the reason why a NPS product (for example exodus damnation, a popular SCRA brand) may be popular on one website but not another.

Relative Advantage

Relative advantage represented the most important aspect of the innovation component of Rogers' DOI. The interview guide for this set of interviews was formed from the findings of the critical analysis (Study One) and therefore the questions asked regarding relative advantages were based on these findings. Nevertheless, there was also the opportunity for the interviewees to identify other relative advantages important for the diffusion of NPS.

Price

Price was recognised by retailers as a secondary relative advantage which would be determined by other relative advantages being present. For example, price may play a role if two products had the same low level of unwanted negative side effects.

R1 suggested that price would play a role in individuals choosing from where to purchase their products as opposed to whether to originally purchase the products. However, there was also the perception that two products, china white and dust till dawn (popular stimulant brands), had become popular because of their cheaper price compared to other products. Conversely, a product which was expensive because of passed on high manufacturing costs did not have high sales levels.

In general, NPS were described as being cheaper than traditional illegal drugs by all the interviewees. There was the perception however, that price was only important to the value of a product. If the price was too high and the achieved subjective effects were not considered good value for money then individuals would be unlikely to purchase the product.

Accessibility

Unsurprisingly, all the interviewees mentioned the importance of the accessibility of NPS as being

an important factor in diffusion. However, there were different views on the importance of the internet or headshops to the growth of the NPS market.

The interviewees highlighted the lack of need for NPS users to engage in the criminal market and avoid interaction with 'shady people' and having to 'scour the streets'. R1 suggested that purchasing products online:

'fills people with a greater sense of confidence in the product than buying a gram (so, realistically, 0.6-0.8g) of mysterious white powder off a guy in the corner of a nightclub who reckons it's probably cocaine' (R1).

This is likely to relate to particular user groups and this was recognised by R2 who stated that accessibility would have been important for individuals experimenting for the first time. Accessibility was also discussed in relation to the ease of purchasing products through websites. This involved the speed and safety of buying online and the anonymity of online purchases. Furthermore, a relative advantage of purchasing NPS online was that customers:

'like to have guaranteed quality' (R2) and products would 'always be available' (R3).

Two interviewees felt that the internet had been the most important purchasing source for the growth of the NPS market. Contrastingly, one interviewee felt that headshops had been more important and that the online NPS market had 'inherent limitations with ecommerce'. Whilst other interviewees highlighted the importance of the use of credit cards to purchase NPS products, R1 highlighted the challenges. These challenges were the waiting times encountered with ordering and receiving products and the requirements associated with obtaining a credit or debit card before an individual can place an order. They also emphasised the ease of purchasing NPS in a headshop in comparison and stated that this was the reason that brick and mortar headshops controlled the largest portion of market. It was interesting that one of the retailers questioned the ease of access associated with purchasing through the internet; instead focusing on the ease of access offered by headshops. It is unknown whether the other retailers shared this view but wished not to disclose this because they were online NPS retailers or because they did not agree.

Purity

Although there was an emphasis by the retailers on the guaranteed purity and quality of NPS products, especially in comparison to their traditional illegal equivalents (R1), the extent to which this affected the diffusion of different NPS was undetermined.

The importance of purity as a relative advantage was perceived as moderately important by one interviewee. However, interviewees emphasised the ‘guaranteed’ quality and purity of the NPS products they sold, as well as stating that the ingredients listed on the packet of an NPS would be accurate:

‘so if they say it contains X percent of this, then it will contain that’ (R3).

Therefore, R1 suggested among customers that there was an:

‘expectation of certain levels of purity and consistency... Whether or not there’s any truth to that is hard to ascertain’ (R1).

The interviewees recognised the emergence of mephedrone at a time when the quality of MDMA and cocaine was low. During this time, more individuals became aware of being able to purchase:

‘perfectly legal replacements with guaranteed purity if you’re buying from the right place’ (R2).

It is likely that purity is a secondary relative advantage. For example, the interviewees acknowledged the emergence of mephedrone relating to purity levels. However, this was in relation to comparative purity levels of traditional illegal drugs.

Lack of detection

The relative advantage which many (but not all) NPS offered by not being detected in forensic drug screens was perceived as having differing levels of importance. NPS workplace testing was described as a ‘huge deal’ by R1 whereas R2 perceived that it was not the most important factor as in the UK workplace drug testing was not that common in comparison with the USA. One interviewee suggested this was important in prisons and all highlighted drug screening in the workplace. This is likely to be a result of the customers of the interviewees being in the latter user group as opposed to the former.

This relative advantage was not seen as vital for diffusion, with the exception of the prison setting. Although it was interesting that the retailers also focused on this as a relative advantage for other user groups. However, although there was a focus on this as a relative advantage, it was only for specific user groups as opposed to the wider general population.

Psychopharmacological effects and side effects

The importance of the psychopharmacological effects of a product were recognised as an important relative advantage; being that the perception of effects of a product as positive or desired effects by customers of the retailers would inform decisions around which products to stock. R3 highlighted the psychopharmacological effects as the key relative advantage by stating that, in their opinion:

'the main reason why they buy it [an NPS product] is for the effects' (R3).

However, the importance of effects in comparison to other available products was also highlighted. R1 felt that psychopharmacological effects played a 'huge role' but this was dependent on the comparative relative effects of available, similar products and 'what it is replacing on the street' (R3). The positive effects associated with mephedrone were discussed and R1 suggested that:

'If everything were still available to buy legally in pure form, mephedrone would top the stimulants category by a mile, even over cocaine. But, now mephedrone isn't available through the same channels as other NPS, people have moved on' (R1).

The psychopharmacological effects and side effects of a product played an important role in the products the retailers chose to sell. For example, R1 stated that they did not stock mephedrone due to its 'weird vasoconstrictive effects' or MDPV because it was:

'ridiculously addictive and pharmacologically more potent than anything else people were used to' (R1).

The strength of a product was also perceived as important in determining the popularity of a product or affecting personal preference. For example, the selling of an extract of Kratom (a stimulant) which was 'much stronger' and therefore was much more popular (R1). Within a substance category, for example SCRA, individuals would choose a product based on its strength. The strength of a SCRA product was based on the ratio of chemical to the weight of the herb included in the product. R2 explained that they graded products so individuals were able to identify the strength of the product comparative to other products. Within the SCRA category, the ratios for the two cannabinoid receptors CB1 and CB2, which would give different effects, were also advertised. The most popular SCRA product on the website of R2 was 5F-AKB48 which was introduced in 2013. The product was described as not the 'strongest' product, but it had a good and balanced effects profile that people appreciated (R2). Other factors relating to effects were also mentioned including the cannabinoid flavour of different SCRA (R3) and gogaine was perceived by R2 as being popular due to its role as a 'psychologically addictive stimulant'.

The effects of an NPS product were therefore a key relative advantage in the diffusion of NPS from the perspectives of the retailers. The retailers were able to offer an interesting insight into the retail perspective behind selling different products and what effects were important for customers. In addition, they were wary of selling products with severe side effects.

Perceptions of the relationship between NPS and traditional illegal drugs

The perception of the relationship between NPS and traditional illegal drugs was an interesting aspect of the interviews with the retailers. There were differing views on the nature of the relationship and how to market NPS products in relation to traditional illegal drugs.

Interviewees were asked about the similarities in effects between NPS and their supposed traditional illegal substitutes. This was considered an important factor although there was a perception that this relationship had changed. One of the retailers felt that the similarity in terms of effects of NPS and traditional illegal drugs was the ‘biggest draw to NPS’. The relationship between the marketing of NPS and traditional illegal drugs had changed however, and was now conveyed through NPS being represented as:

‘stronger than cannabis’ or ‘less confusion/euphoria than crack/amphetamines’ (R1).

The importance of marketing was questioned by another retailer who suggested it would not be important for an NPS user as they would not be pre-existing traditional drug users. This is likely to be due to R2 perceiving NPS users to solely use NPS for experimentation, evading detection in drug testing or to evade the illegal aspect of traditional illegal drugs. When the interviewee was asked how diffusion of products would be affected following the PS Act, they used the term ‘move’ to describe the shift from NPS use to traditional illegal drug use. This was interesting as the other interviewees used the term ‘revert’, suggesting a move *back* to traditional illegal drugs whereas R2 seemed to imply that users would be changing to traditional illegal drugs for NPS for the first time.

R3 suggested that the products sold on their website were higher quality than traditional illegal drugs. The same retailer also stated that their products matched relatively closely, with the exception of heroin where an NPS equivalent had not yet been manufactured. They perceived their SCRA products as producing effects which were very close to the effects of natural cannabis. The others recognised however, that the psychopharmacological effects of SCRA and cannabis were different. R2 perceived that SCRA products were more harmful than cannabis and this was, in their opinion, a consequence of ‘irresponsible’ manufacturers creating ‘extremely strong’ products. These products would be double the strength of the substances R2 would sell on their website. R3 felt that the NPS cocaine substitutes sold on their website were very similar to cocaine. Conversely, R2 perceived that cocaine

had a higher harm level than the stimulants sold on their website as these were of guaranteed purity.

Legality

Interestingly, differing views about the importance of legality to the diffusion of NPS were expressed. R1 perceived that:

'the legality appeals to idiots [who think that they would not face consequences for] being intoxicated in the wrong environment' (R1).

Conversely, whilst acknowledging that there would be some individuals who would not be affected by legal status, R2 suggested that legal status:

'absolutely was important to a good section of the market' (R2).

The third retailer felt that previous legality of NPS was one of the main reasons for NPS use due to individuals wishing to avoid breaking the law. They stated that legality played a:

'A big role... It's a big plus isn't it really? I'm sure it annoys the police when they pull someone over and he's got this herbal high in his pocket, they can't nick him for it. Even though it's probably having the same effect as the illegal high... it's a big point' (R3).

The importance of legality was recognised as being important for different user groups. For example, one retailer suggested that the legal status was an important relative advantage to their customers who were mostly young professionals or 'middle aged people... with good jobs' who would not want to interact with the criminal side of purchasing drugs.

The range of opinions on legality was noteworthy with contrasting views on its importance as a relative advantage. Whilst one retailer perceived legality not to be a relative advantage associated with NPS use, another felt it would be very important for different user groups and the third perceived it as a key relative advantage for the use of NPS.

In conclusion, the relative advantages of an NPS were regarded as important. Therefore, Rogers' DOI theory is appropriate in showing how the relative advantages of the innovation, NPS, influence diffusion. Interestingly, there were contrasting views on aspects such as legality and the importance of the internet for accessibility and influencing the diffusion of an NPS. However, although different retailers suggested the vital importance of different relative advantages there was a consensus that the desired psychopharmacological effects of a product and a lack of severe side effects would

influence whether a product successfully diffused. The importance of these relative advantages is conveyed through the effects of a product affecting choices surrounding which products to sell on their websites.

Communication Channels

Mass media channel

The media was seen as a key communication channel in making products known but the coverage of NPS in general in the media was perceived as negative. R1 suggested that it was the media which had brought NPS ‘into the mainstream’. They suggested that every time there was a mention of NPS, either in relation to a death or a mention of the product in general:

‘someone hears about them for the first time and decides to find out more’ (R1).

The media coverage was perceived to have helped the market grow and R2 suggested that when their website was mentioned in a story that this made potential new users aware. Media coverage of a particular product played a role in their popularity:

‘they [the media article] called ethylphenedrate ‘legal crack’ and it’s nothing like that in the slightest. But obviously that will no doubt have gone down well with certain people, with certain users, who would have thought that that was a good recommendation’ (R2).

From a retailer perspective however, this was likely to be negative in the longer term as it may result in the government choosing to ban the product. Although R2 gave the impression that they were not influenced by external communication channels such as the media or online forums, they stated that they stopped selling opioids, two years previously because selling what the media referred to as ‘legal versions of heroin’ was controversial. R1 described how previously they were more selective about the products sold but following a negative story printed in the Daily Mail, that:

‘no one else cared if we considered ourselves to be responsible’ (R1).

They therefore became more apathetic and became less selective about what was sold. This conveyed that the retailer did not think that their customers would be influenced by the media as a communication channel. Therefore, they did not need to adhere to the reporting in the media in determining which products to sell. However, the same interviewee stated that, from their perspective, the media was the biggest market force for driving sales. This was an interesting juxtaposition. Similarly, although the retailers gave the impression that the media wrote sensationalist stories which did not accurately reflect NPS; it was interesting that R2 was influenced by the reporting. R2 perceived that their customers would also be influenced and that is why they removed synthetic opioids from their website.

R1 stated that, from their perspective, the media reporting a negative story highlighted the efficacy of a product and therefore this was likely to play a role in its popularity. The same retailer perceived that individuals would choose a product based on whether the media had named it. Of the most

popular products sold on the website, R1 stated that gogaine was popular because of the media focus. Black mamba, Pandora's box and herbal haze (all SCRA brands) were also all mentioned as popular because of their frequent references in the media. One of the interviewees perceived that:

'if a symmetry exists between all similar products initially – for example, black mamba vs blue cheese vs armageddon vs Pandora's box... then the media has a huge role in breaking that symmetry and pushing forward an arbitrary winner. If a product is mentioned by name, people will search for that product by name' (R1).

They also stated however, that demand would increase for a short period of days but then decrease. R1 perceived that media coverage was not proportionate to the risk of a product. Additionally, two interviewees stated that if there were negative stories about a product this would not affect decisions of whether or not to sell the product. R3 also felt that that negative reports were unlikely to affect the decision of an individual. They suggested that individuals who read media reports separated themselves from the individuals in the reports, thinking:

'I know my limits, this person obviously didn't' (R3).

R2 suggested that some of the negative press coverage was fair and that the 'downfall' of the NPS industry was due to irresponsible manufacturers creating SCRA products which were too strong. This had led to negative press coverage even though this was seen as fair in relation to these products. However, there was a perception from the other retailers that there was disproportionate media focus in comparison to alcohol or tobacco:

'I don't recall ever hearing any media reports on how they're sort of beneficial to society or anything positive about them' (R3).

In conclusion, there was a perception that although the media in general portrayed NPS negatively, the naming of a product or a retail website was likely to have an impact on sales of the product. However, the differing levels of influence are likely to vary with different adopter categories, which will be explored later in this chapter. For example, pre-existing knowledgeable innovators are unlikely to rely on newspaper stories to choose an NPS product. In contrast, a first time experimenter, who may be a member of the late majority adopter category, may be influenced by a story which mentions a particular SCRA product and the website from which it can be bought.

Interpersonal channel

Offline friendship networks

The importance of offline friendship networks was only mentioned briefly by two interviewees. R2 suggested that offline friendship networks were previously an important factor in individuals purchasing products from headshops and that:

'word of mouth in social groups has contributed to the increase in use' (R2).

The importance of online forums and friendship networks was seen to be dependent on the type of NPS. For example, for the 'legal highs', the role of friendship networks was likely to play more of a role in a product becoming popular in a particular social system. However, for the 'research chemicals', online forum discussions were likely to be more important. This appears to relate to the different user groups who are associated with use of these two categories. For the 'legal highs', which were perceived to include branded products sold in headshops such as exodus damnation (a popular SCRA brand), the individuals engaging in using and sourcing these products from headshops were likely to be younger users or vulnerable user groups. These user groups fall more into the 'late majority' or 'laggard' adopter categories. These groups are unlikely to engage in high levels of forum use and therefore word-of-mouth around popular products will have greater importance.

Conversely, individuals engaging in use of 'research chemicals' are more likely to be psychonauts, who fall into the 'innovator' adopter category, or individuals who have high levels of forum use who can be seen as 'early adopters'. These user groups will be influenced more by online forums as an interpersonal channel, although they are still likely to be influenced by offline friendship networks as a communication channel.

Online forums

Online forums were seen as an important communication channel in influencing diffusion of an NPS and also for harm reduction. R3 stated that online forums were how 'word gets around' about products. Similarly, R1 highlighted the testimonials of other individuals on forums but also the products sorted on the forums as the most popular as likely to influence product choice. One interviewee described forums as very important in affecting the popularity of a product as they are:

'pretty much the primary source of info on new products' (R1).

The perception by the interviewee is likely to be the objective observation that information on a new product is formed in online forums. For different users however, their primary source of

information will appear from different communication channels. R1 highlighted the importance of the positioning of a negative or positive report on a thread about NPS:

'even if 99 out of a 100 people really enjoy a new substance, if that one person with a negative experience replies first to a thread about a new substance, that will have a knock-on effect on popularity and uptake' (R1).

The forums were seen as quickening the diffusion process of an NPS product; if an individual was 'raving about' a product on the forums this was likely to influence other individuals to try it (R2). They suggested that a product would take between six and nine months to 'gain traction'. However, if there was positive feedback on the forums then this could shorten the process.

All the interviewees agreed that the internet had been important in the growth of the NPS market. One interviewee (R1) explained that they looked on the forums as a source of information and to determine which products to sell. Another (R2) explained that if there was a product which people were 'raving about' on the forums then this would be likely to encourage them to sell the product on their website. However, they stated that there was rarely a time where there was a popularly discussed product on forums which was not already being sold on their website. For some retailers, the online forums were their 'gospel', but R2 explained that their customers were unlikely to actively post and use the forums and it only represented 'two percent of the market'. R2 also stated that caution was still needed when reading the forum entries as users could be fickle: there was a product which was selling very well on their website but simultaneously was 'totally slated' on the forums. They also explained that they would not pay too much attention if a product had received negative reviews. All the interviewees also recognised the importance of the forums from a harm reduction perspective for the users.

In summation, the communication channels associated with NPS use were perceived as influencing NPS diffusion. There was also the perception that a communication channel, an online forum, had the influence to impact on the speed at which an NPS could successfully diffuse. Although the media was perceived as negatively portraying NPS, there was an acknowledgment of the influence it held over the diffusion of different products if mentioned by name. The role of friendship networks was not explored to the extent of the other communication channels; this was likely to be a result of a greater focus on the other communication channels which are seen to be more unique to NPS use.

Time

Retailers discussed users of their products generally and recognised different categories of users according to their product choice and their motivation for use. Two retailers felt that pre-existing drug users would be choosing to use NPS and would use the products in similar situations and patterns to traditional illegal drugs. However, R2 recognised that some individuals with no experience of drug use may choose an NPS product due to its legal status.

Innovators and early adopters

Interviewees were provided with a description of Rogers' adopter categories and were asked which category they thought their customers fell into. Early adopters were mentioned by R1 as applying to a few of their customers. They suggested that this was shown through customers sending emails asking about different products which were not stocked, as the retailer had not heard of the product or they decided that from their own knowledge that the product was too dangerous. R1 however also suggested that their website as a whole existed as an early adopter as it was past the innovator stage. This was due to their role as a retailer in deciding whether to stock a product based on their judgement that it would become popular without users experiencing negative effects.

Early majority, late majority and laggards

In relation to the early and late majority, R1 suggested that the majority of their customers would fall into these two categories. Similarly, R3 suggested that their customers would be in the late majority but may also be considered as laggards. Their customers were seen as laggards in that they were end users and therefore would be unlikely to source their products from chemical sites, instead choosing to purchase products from NPS websites. R1 perceived that laggards were likely to be the customers who purchased products following media exposure of a product. Media reporting would be the first time they heard of the product and then they would research the product using Google. R1 suggested that they themselves existed as:

'somewhere between an early adopter and the early majority' (R1).

However, they stated that they had a background in pharmacology and would only stock items after a significant amount of reading, which would suggest characteristics of an innovator.

In conclusion, there was a consensus that individuals purchasing products from the websites of retailers were likely to be late majority adopters. This was highlighted through their adoption of an

NPS product relatively late in the diffusion process: after it had been rejected or adopted by innovators or early adopters and therefore had been stocked on a retail website. The retailers themselves could be identified as innovators or early adopters. They would have the biggest influence on whether a product could diffuse through their choice to stock it on their website. However, the retailers also mentioned their monitoring of online forums to check which products were popular. This suggests acknowledgment of early adopters and opinion leaders on the forums and therefore they may exist as individuals in adopter categories later in the diffusion process.

Social System

Opinion leaders and change agents

Whilst opinion leaders were perceived as existing, the existence of change agents was difficult to determine from the interviews. R1 stated that they did not use change agents to promote the sales of a particular product. However, there was a recognition of the existence of opinion leaders on forums; there were members who had greater influence and this may be due to their length of time as a member and their number of posts. Additionally, forums such as drugs-forum.com allowed users to score forum entries on their quality. Therefore, the quality and clarity of a forum post were also likely to influence whether an individual was an opinion leader or not. In addition, R2 acknowledged that there were forum members who were very knowledgeable, perhaps more knowledgeable than the retailer, and this was beneficial for harm reduction. They explained that the forums needed:

‘some sensible heads on there really to put a brake on some of the more rash people’ (R2).

They also suggested however, that some individuals may paraphrase other posts in order to appear knowledgeable and therefore may not be true opinion leaders.

To conclude, it may be the case that the retailers were reluctant to acknowledge the existence of change agents or conversely, they themselves did not employ them. There was a perception from the retailers that opinion leaders were in existence. However, they were mentioned only relating to online forums and therefore it is difficult to determine where offline opinion leaders exist.

Study Strengths and Limitations

The study strengths included the benefit of interviewing NPS retailers on their opinions surrounding the topic of NPS and the PS Act which had previously not been gained. Therefore the research has filled this important gap. The perspectives of retailers or vendors more generally are often ignored within the wider debate around NPS and this study aimed to voice their experiences and opinions as much needed valuable contributions.

With the introduction of the PS Act, it is likely that accessing this group will become increasingly challenging and that a number of retailers will choose a new employment; this was the case for one of the interviewees in this study. Therefore, the study has contributed to the field by gaining access to this group and expressing their perspectives before this population of UK retailers legally selling NPS online disappeared with the introduction of the Act.

In terms of limitations, despite the imminent introduction of the PS Act making their business activities illegal in the UK, interviewees were open in talking about their profession and their perceptions of the importance of different NPS attributes. However, the perception of one interviewee was that the interviewee was answering the questions in a manner that implied they were saying what the interviewee wanted to hear. For example, throughout the interview, there was an emphasis on the quality and purity of the products which were sold on their website.

The small sample size of this group raises questions as to the generalisability of the data. It is therefore not suggested that it represents the views of all online NPS retailers who existed at the time of the interviews. Furthermore, the three interviews were conducted in three different forms which may also affect the validity of the data. For one interviewee, the questions were sent to them and therefore questions in this form were unlikely to lead to participants veering away from the questions. In addition, this interviewee would have time to reflect on the questions asked and therefore convey their message more effectively. Conversely, this has limitations as the spontaneous nature of live interviews is lost. Furthermore, individuals have more control and are able to construct answers in a more prepared manner.

The timing of the three different interviews also has limitations. The final interview took place after the PS Act had been introduced, in contrast to the first conducted interview where there was uncertainty surrounding the Act. It may have been the case that if the interviews had been conducted with different retailers or a larger number of retailers, different findings may have emerged. Additionally, this thesis focused only on online retailers, had there been interviews with headshop retailers, the findings from the interviews would likely be different.

Conclusion

In summary, the retailers offered an interesting perspective relating to the diffusion of NPS and the factors which affect the successful or unsuccessful diffusion of different products. Rogers' theory can be seen as appropriate in exploring the diffusion of NPS from the perspectives of retailers. The psychopharmacological effects of an NPS product were perceived as playing a key role in successful diffusion. Additionally, communication channels were viewed as playing different roles of influence for different adopter categories and user groups. The existence of opinion leaders was acknowledged, however the existence of change agents was unconfirmed.

With regards to the PS Act, it was felt to be ineffective and it was predicted that the majority of users would source their products from the underground market which would lead to an increase in harm for users. The retailers, whilst acknowledging its weaknesses, had an understanding of why the Act had been introduced and interestingly did not display the same level of strong negative opinions as many of the professionals (Study Three) who were interviewed.

The retailers conveyed a high level of honesty in discussing their NPS retail. However, there was also certain aspects which suggested that they were aiming to perceive their behaviours and NPS products in a positive light. For example, through the distancing from the actions of irresponsible retailing. Nevertheless, exploring the perspectives of NPS retailers offered an interesting contrast to the professionals interviewed.

Chapter 6: Study Three - Interviews with Professionals

The 20 interviewees (P1-20) were drawn from a range of relevant professional groups and positions. They included a local police inspector, a toxicologist, a government health department representative and a former UK Minister. Internationally, interviewees included representatives from New Zealand, Poland and the USA in a range of professions including a representative from a charitable trust and the EMCDDA. The interviewees who were from countries outside the UK were asked about the prevalence of NPS in their countries but also the introduction of the PS Act in the UK. When interviewees from countries outside the UK were asked their thoughts on factors affecting NPS use, it was understood that their answers referred to the NPS market in their own country, unless they were specifically asked about the UK market.

A number of themes emerged from the qualitative interviews with the professionals. As there was a range of professionals, the contrasting views were unsurprising. Nevertheless, the contrast on some aspects of NPS use was not as wide ranging as initially expected. Furthermore, individuals in similar professions, for example the two individuals in the police had conflicting views on many aspects of the PS Act. The PS Act, which was introduced during the interview period, was predictably a focus of interviews with UK professionals. However, key themes also emerged during the interviews beyond aspects of Rogers' DOI; these included the definition and perceptions of the actual prevalence and use of NPS.

The chapter begins by exploring the perceptions of NPS prevalence and the definition of NPS. The perceptions of the interviewees of the PS Act are then explored. Finally, the findings from the interviews are applied to Rogers' DOI.

NPS prevalence

Perceptions of the prevalence of NPS frequently referred to perceptions of the role of the media in exaggerating use. Furthermore, defining NPS was problematic which was highlighted by the group of interviewees suggesting different definitions.

Perceptions of the prevalence of NPS use

NPS were perceived as an issue by the majority of interviewees but many suggested that their existence as an issue had been exaggerated. The prevalence of NPS in the UK was compared to that

of traditional illegal drugs and the interviewees who commented on the issue agreed that their popularity and use was not to the extent of traditional illegal drugs.

It was noticeable that the toxicologist interviewee suggested that:

'we're probably in danger of overestimating their [NPS] relevance and importance' (P8, toxicologist).

However, P14 (drugs charity representative) suggested that the popularity of NPS had increased but that estimates were low to begin with. They stated, from their perspective, that they were not particularly popular and emphasised the exaggeration of their use throughout their interview. Additionally, P2, as a public health impact coordinator, stated that they had not seen an increase in numbers of people using their services. Whilst NPS use may not be at the levels of traditional illegal drug use, among certain groups, prevalence was perceived as high and a significant problem. For example, in prisons, among vulnerable groups and the homeless population.

P3, an international ministerial representative, suggested that Ireland, the UK, Poland, Romania, Latvia, Hungary and Sweden were countries experiencing past and current NPS problems. Whilst many UK interviewees suggested NPS use in the UK had been exaggerated, it was interesting to hear an interviewee from Poland perceive that the UK had an NPS 'problem'. It was also noticeable that the countries which the interviewee suggested were only European countries and countries such as New Zealand were not mentioned. The representative from the USA (P5) stated that the US market for NPS had grown and there has been a steady increase in recent years. Contrastingly, the representative in Australia (P13) suggested that there had not been rapid growth in NPS use in Australia.

The definition of NPS

Whilst a number of interviewees highlighted the perceived difficulty of measuring NPS prevalence, a further theme which emerged was the challenge of defining NPS. The volume of different NPS was acknowledged and consequently the actual definition of NPS was seen as a challenge:

there is a 'difficulty of knowing what NPS actually are' (P13, international academic) and *'it's important to be clear about what it is that we're talking about with NPS because it's not a particularly well-defined term in my view'* (P20, think tank representative).

This was recognised especially by the participant who was an international academic and an individual working for a think tank which is problematic in terms of being able to communicate the definition of NPS to other stakeholders. This is even more problematic in light of the PS Act. The interviews took place before and after the Act was introduced and NPS were generally defined in

relation to:

'the legal high shops, [both online and offline] the headshops selling substances that aren't controlled' so can be *'legally purchase[d]'* (P14, drugs charity representative).

However, the issue was raised as to whether this extended to drugs that are now included under the MDA including ketamine and mephedrone. Challenges among professionals in defining NPS is problematic. This also suggests that users will have difficulties in defining when they have used NPS and therefore measuring prevalence becomes more difficult. Solutions to this challenge were not provided by any interviewees.

P16, a government health department representative, perceived the term 'NPS' as a flawed concept. In relation to 'new', they stated that there was not a consensus as to how long they were new and suggested that the definition of NPS related more to the speed in which the drugs were synthesised and appeared on the market. P17, the representative from New Zealand, provided a further different definition emphasising the challenge of differing definitions internationally. P20 (think tank representative) highlighted the different ways in which people define NPS. They explained that for some individuals how 'new' they were was important, for others that they were synthetic was important. Furthermore, they perceived that defining them as 'legal highs' was problematic because of inconsistencies relating to their legality and indeed following the introduction of the PS Act, they are no longer legal. P12 (EMCDDA representative) suggested that the definition of NPS now extended beyond the 'legal highs phenomenon' to include fentanyl analogues being sold as heroin, fake oxycodone tablets or generally 'fake prescription medicines' because they are not controlled under the UN conventions. P12 as a representative from the EMCDDA was able to comment on the NPS market from a European perspective and therefore whilst the NPS market may be diversifying on a more international scale, this may not be applicable to the UK market.

It was interesting that whilst the retailers (Study Two) distinguished between a 'legal high' market and a 'research chemical' market, the professional interviewees did not make this distinction. An exception was P12, who acknowledged that NPS now included substances not recognised as typical 'legal highs'. For the other interviewees however, although they recognised the challenge of defining NPS, they characterised NPS under one definition. Yet during the interviews there was an emphasis on the importance of not characterising NPS as a homogenous group.

Diffusion

P12 (EMCDDA representative) described the use of a diffusion theory to explain the diffusion of NPS as ‘logical’ as many of the prerequisites for diffusion are in existence in ‘the NPS world’. However, the need to examine the diffusion of substances on a ‘substance by substance basis’, as opposed to as a whole, because of contextual factors and different influences affecting diffusion was emphasised.

The diffusion of NPS products varies between countries and it was acknowledged there was difficulty in identifying a substance with broad interest across Europe. NPS were described by a member of the ACMD as being ‘ingrained in our culture’ (P9) which would suggest successful diffusion. However, a new substance successfully diffusing was described by a government health department representative as happening only ‘every so often’ (P8). P12 (EMCDDA representative) perceived that not many substances get a foothold and become prevalent in the general population. The process of the majority of NPS was described as:

‘they arrive, they don’t do an awful lot and then they sort of disappear’ (P19, police representative).

This can be seen as unsuccessful diffusion. The rate of diffusion of an innovation was suggested as having become faster and this relates to the change in communication channels and the emergence of the internet. The speed at which new substances appear on the market and the range of different substances is also likely to have contributed to this.

Mephedrone as a drug successfully diffusing in the UK

Although the popularity of mephedrone was not consistent throughout Europe, use was especially prominent in the UK in 2009 and 2010. It was recognised by the majority of interviewees as an NPS that had successfully diffused into the social system in the UK.

The terminology used by one interviewee in particular, to describe the popularity of mephedrone in the population suggested diffusion:

‘a rapidly growing NPS’, ‘taking the country by siege’, ‘an extraordinary rise in the number of users’ and taking a *‘strong hold’* in the user community (P9, ACMD representative).

One interviewee suggested that a substance reaching high levels of popularity and use in a social system would be ‘the new mephedrone’ (P19, police representative). Mephedrone was perceived to be an NPS which epitomised a successfully diffused drug and the toxicologist, from their perspective, stated that:

'if you wanted to develop the drug of misuse then if the pharmaceutical industry had developed mephedrone they'd be absolutely delighted... it ticks all the boxes' (P8, toxicologist).

There was agreement among the interviewees that this diffusion was because of, among other factors, its purity and availability in comparison with traditional illegal drugs, in particular MDMA and cocaine. However, perceptions of UK current use were perceived to have declined.

Other NPS successfully diffusing in the UK and internationally

SCRA were also perceived to be drugs that had diffused in the UK. For example, it was interesting that P14 (drugs charity representative) suggested this, as they were sceptical as to the extent of general diffusion of NPS. P8 (toxicologist) however suggested that the diffusion of SCRA was only occurring in small geographic areas and by certain populations. The successful diffusion of SCRA can be demonstrated in the banning of different generations of compounds in 2008, 2012, 2014 and 2015 and P9 (ACMD representative) perceived that the problem still existed. Similarly in the USA, the international EWS representative (P5) perceived there to be 'a lot going on' with SCRA and a few of the original JWH [SCRA] compounds were still in circulation, especially in Washington DC. Synthetic opioids were also suggested (P5) as becoming an emerging issue in the USA, and these included UK47, 700 and W18. Additionally, P13 (international academic) suggested an increase in both use of and discussion of SCRA in 2011 and 2012 in Australia and problematic use of these substances.

Although SCRA were seen as an example of successful diffusion in the UK and other countries, the level of diffusion was still not to the extent of cannabis. Furthermore, SCRA are a broad category and describing SCRA diffusion does not extend to all SCRA products.

The UK Psychoactive Substances Act

The interviews took place over a three month period and this included the introduction of the PS Act on the 26th of May 2016 in the UK. Therefore, a key focus of the majority of, and all of the UK, interviews was perceptions of the Act and how successful it would be in both reducing use and stopping the supply of NPS.

Perceptions of the motivations for the introduction of the Act

When discussing the motivations for the PS Act, the need to close headshops, political motivations and inadequacy of current legislation were all perceived as key reasons for its introduction. Ending the ‘very open unregulated sale’ (P16, UK government health department representative) of NPS was perceived as a key reason. This was the stated policy aim of the PS Act. One interviewee (P2), who was a public health impact coordinator, suggested that because headshops were visible that the PS Act may have been a political decision. Indeed, other interviewees suggested that the Act was a political decision influenced by the media; the representative from Poland perceived the motivation behind the Act as ‘society pressure’ (P3). There was a perception that through changing the legality and accessibility of NPS:

the Act would banish ‘*embarrassing stories about kids buying potent highs in high street shops*’ (P4, drugs charity representative).

One interviewee proposed that the government were:

‘*so desperate to be seen to be doing something about legal highs because of the media reporting around things like ‘legal highs’ death’ when legal highs weren’t even involved*’ (P14, drugs charity representative).

Conversely, two interviewees suggested that the government implementing a form of legislation was necessary as the situation needed addressing. Current NPS legislation in place was criticised and this was also acknowledged by a participant from the ACMD who perceived the MDA as being inappropriate for NPS legislation. The rapid emergence of substances meant that legislation was reactive, rather than proactive, and the government could not keep up (P10, police representative). P10, stated that from their perspective, the police were struggling with how to deal with NPS as they had:

‘*no tools*’ to do so but ‘*it was causing us as much disruption as your heroin, your cocaine, the rest of it*’ (P10, police representative).

Perceptions of the Act

Although motivations for the introduction of the Act were acknowledged, when the PS Act was discussed during the interviews, the majority of interviewees viewed it negatively. It was interesting to note that the interviewees from the police viewed the Act in contrasting ways. One representative, who was more involved in the daily policing of NPS use, although positively viewing the introduction of new legislation, criticised the Act for not going far enough to stop the use of NPS. Additionally, the UK ministerial representative (P15) avoided criticising the Act but acknowledged that there would be challenges in its implementation especially in relation to the internet. Certain interviewees were obviously angry about the Act whilst others mocked aspects of it. Whilst the beneficial aspect of the Act in eliminating the visible sale of NPS was praised, the interviewees who did this were more positive about the Act generally.

The legislation was described as:

'poorly conceived, poorly executed', 'just so crass and so poorly thought out' (P1, addictions psychiatrist), *'rubbish. I don't like it. I understand the need to respond, I think it's the wrong response'* (P4, drugs charity representative), *'the very weak legislation, the very badly drafted legislation'* (P14, drugs charity representative), and *'so vague... non-descript... probably really difficult to implement or make any real change'* (P18, young people's substance misuse service representative).

However, the policy aim of closing down headshops was viewed positively by half the interviewees. This was especially in relation to stopping the ease of access for vulnerable groups and one of the police representatives (P10) confirmed that there was nowhere obviously selling NPS presently in their city. One interviewee spoke about the Act from their role as a toxicologist (P8) through highlighting the current NPS situation where untested chemicals were being sold and they praised the Act from this perspective stating that at least the Act was an attempt to try to address this. P9 (the ACMD representative) hoped the Act would limit the growth of different NPS and the blanket ban meant that government intervention would not be constrained by the time limits of TCDOs. The more senior police representative described the Act as 'useful' as following an:

'initial hit on headshops, suppliers and internet' it will be used to deal with *'particular problems'* (P19, police representative).

The terminology used by this police representative was interesting and it seemed to suggest the method in which the Act will be policed. P19 also viewed the PS Act as also having the:

'opportunity to have quite a large scale impact [on nitrous oxide]' (P19, police representative).

This is through deterring the sale of nitrous oxide and for dealing with individuals selling it in large quantities.

Perceptions of the criminalisation aspect of the Act

The Act not criminalising possession was viewed positively by a number of interviewees however, this was strongly criticised by one interviewee. The interviewee, who worked in the police, perceived that the message being relayed to users was:

‘almost like incentivizing, you’re not going to get into bother for having it as long as you don’t sell it to anyone else, just use it yourself’ (P10, police representative).

It was noticeable that only one interviewee suggested that the Act should have penalised possession but that it was a member of the police dealing with NPS usage first-hand daily who did so. Both police representatives praised the penalisation of possession in prison, although this was criticised by P4 (drugs charity representative) who described it as unfair.

Tension with the Misuse of Drugs Act

An issue that was frequently raised was the confusion and tension between possession of a substance being illegal under the MDA but not under the PS Act. This was recognised by a wide range of interviewees including a police representative, an individual from the ACMD and an interviewee from a think tank. The representative from Poland suggested that the Act will mean that it is:

‘better to have NPS in your pocket than heroin, amphetamine or cannabis’ (P3, international ministerial representative).

The interviewee from the think tank further highlighted the problematic and confusing message that this relays:

‘if you’ve got some ecstasy powder or ecstasy pills on you, you can get seven years in prison. But if you’ve got another pill that’s effectively going to have the same effects as ecstasy and has a similar or equal risk profile but is covered by the NPS Act you won’t be subject to any sanction at all’ (P20, think tank representative).

P9 explained that this tension meant that:

‘one [the MDA] is based on harm, the other one [the PS Act] is based on just identifying psychoactive substances’ (P9, ACMD representative).

These challenges are especially applicable for the police in finding someone in possession of a substance and knowing whether to prosecute the individual for possession of an illegal substance under the MDA or to forensically test the substance to determine whether it is an NPS. This is another example of the effectiveness of the PS Act being questioned.

The definition of psychoactivity

The definition of psychoactivity was a key criticism of the PS Act in terms of practicality of implementation for both the police and Crown Prosecution Service. This criticism is frequently alluded to in the media and in the literature. The action of proving the psychoactivity of a substance was described as relatively difficult by the toxicologist interviewee (P8) and ‘unenforceable’ and ‘fraught with problems’. This will have an impact on the effectiveness of the Act as one of the police representatives (P10) suggested that if people are not being prosecuted in court then individuals may be more willing to become involved in the supply of NPS.

Even P15 (UK ministerial representative) who was involved in the creation of the Act admitted that they were happy with all aspects of the Act with the exception for the threshold for when a substance became a NPS. The decision to use the term ‘psychoactive’ and implement a blanket ban came about because the ACMD:

‘were told that the Home Office lawyers couldn’t use the word ‘novel’ because it’s not legally definable and therefore they just use ‘psychoactive’ (P9, ACMD representative).

However, the more senior police representative addressed this criticism and confusion:

‘If we go back to some of the concerns that people have, actually they’re misplaced because in order for it to be a psychoactive substance under the Act you’ve got to have the intent anyway. If there’s no intent, it doesn’t count’ (P19, police representative).

Nevertheless, the problems determining the definition of psychoactive still exists for the police. P9 (the AMCD representative) explained that, from their perspective, because of this the police would be likely to focus on large dealers as opposed to personal drug users. One of the police representatives suggested that, from their perspective, the inconsistencies between the definition of psychoactivity and the MDA and PS Act would mean that for the police it would be:

‘really frustrating if we get the warrant, get the drugs back and the Crown Prosecution Service say ‘ok you’ve proved it’s NPS, but you’ve not proved the [psychoactive] effect’. And it doesn’t take many of those kind of prosecutions failing for people to think ‘well, why are we busting a gut? Let’s go back and deal with cocaine and heroin which are just straight up’ (P10, police representative).

The Act was criticised for being confusing more broadly and P20 explained that any particular substance may be covered by:

'two, three or even four different bits of legislation' and this made it 'confusing for users, it's confusing for emergency services, it's confusing for the police' (P20, think tank representative).

Perceptions of effectiveness of similar legislation introduced in other countries

A further criticism which emerged related to interviewees questioning the effectiveness of similar legislation which had been introduced in other countries, in particular Ireland:

'... the strange thing is that the [UK] PS [Act] is said to be modelled very closely on the Irish example and yet they have yet to hear from the Irish government any feedback... on whether or not their PS Bill has been successful or not. Five or six years later, because it was introduced five or six years ago, and there's been no special report whatsoever. We have rumours that the Act has hit problems in terms of defining whether a compound is or is not psychoactive and I suspect that's still a weakness of the [UK] PS [Act]' (P9, ACMD representative).

Nevertheless, the Irish Act was described by the UK government health department representative (P7) as being 'very effective' in closing down headshops and this was echoed by the police representative (P19). Poland was used as an example of a country where similar legislation had been introduced and drugs poisonings admissions relating to NPS had increased since this legislation has been in place. The representative from New Zealand explained that a blanket ban on NPS had been ineffective in New Zealand, Ireland and states in Australia and they were not convinced that a blanket ban was going to work in the UK.

However, one interviewee explained cautiously that:

'these are wicked and complex problems... the notion that there's going to be, a simple, one single fix is a fallacy' (P16, governmental health department representative).

Despite the perception that NPS had not successfully diffused to the extent of traditional illegal drugs, with the exception in the UK of mephedrone and SCRA, the interviewees all held strong opinions regarding the PS Act. Throughout the interviews and consequent analysis, the contrast between the opinions of the police and different professions was noticeable. It was also noteworthy that there was a contrast between the perceptions of the different police representatives on issues associated with the Act. The contrast in opinions was especially evident between the two police representatives and the drug charity representatives. The junior police representative and the drug charity representatives

were possibly the strongest critics of the PS Act. Contrastingly, the senior police representative was the most positive about the Act.

This part of the analysis will apply the results of the interviews to Rogers' theory to assess its appropriateness. Rogers' DOI comprises four sections: the innovation itself, communication channels, time and the social system.

The Innovation Itself

The first component of Rogers' DOI is the innovation itself. This analysis will focus on the components which were discussed by the interviewees: compatibility, trialability and relative advantage. Individuals will choose to use an innovation for different reasons and this is highlighted by a lack of widespread appeal across Europe for a particular substance. For this reason, it is important to emphasise examining NPS on a substance-by-substance basis and how the different attributes of different NPS may encourage adoption and affect the rate of adoption.

Compatibility

Compatibility was identified as an aspect in choosing to adopt an innovation in relation to familiarity and also marketing. P1 (addictions psychiatrist) suggested that in Eastern Europe, individuals may be more interested in synthetic stimulants because they are more familiar with them. The components of compatibility were not mentioned by the interviewees, however it could relate to the use by problematic NPS users to inject NPS instead of traditional illegal drugs which they had been using previously. P1 perceived that for some problematic drug users, they:

'apply the same principles for use as they do with the drug they're most familiar with' (P1, addictions psychiatrist).

Marketing

The marketing of NPS was recognised as affecting whether an NPS diffused successfully or not, especially by the two police interviewees. However, this will be affected by the PS Act. NPS had branding which traditional illegal drugs did not have and this meant that NPS were marketed in a new way through the packaging and names. Even the term 'legal highs' is in itself marketing of the products through implying safety. Noticeably it was the two police representatives who perceived the marketing of NPS to be an important relative advantage. Whilst others referenced NPS marketing, they did not imply that this was an important aspect of why an individual may adopt a particular NPS; they spoke of the marketing in a more general sense.

One police interviewee (P10) suggested that in their city it was the products with 'better names' that

were more popular in shops; ‘black mamba’ was the most popular because ‘it was cool’ even though it was perceived by the interviewee as being the same as all the other products. They did not explain however, what they implied by ‘most popular’ although it can be hypothesised that they were referring to the products that they came across most commonly in their work in the city. Marketing may also be in the form of advertising a NPS as similar to an existing traditional illegal drug. The interviewees suggested that marketing would be important for different users. For example, young people were recognised as likely to be more influenced by marketing including the ‘shiny packages’ (P2, public health impact coordinator; P13, international academic) and the exciting names.

Trialability

The opportunity for trialling an NPS product, additionally in relation to curiosity, was recognised by the interviewees. Interviewees suggested that the opportunity for young people looking for something new or trialling NPS related to their (previously) legal status and ease of purchasing the products in headshops or through online retailers.

Trialability was recognised from the perspective of NPS retailers or street dealers offering deals on NPS to both potential new customers but also to existing customers to ensure continued custom. This was likely to have an effect on the adoption of an innovation, in a similar way to any other market. Although NPS may have an ease of trialability, interviewees suggested that the majority of experimenters do so and then decide not to adopt NPS. This relates to the extent to which an innovation meets the needs of the individuals and therefore whilst the trialability of an innovation is important, other aspects of the innovation itself appear more important to ensure successful diffusion.

Relative advantage

The main component of the innovation itself is the relative advantage and this was most appropriate in relation to NPS. Relative advantage is the extent to which the innovation is perceived as better than the innovation it replaces.

Perceptions of the relationship between NPS and traditional illegal drugs

All interviewees spoke of NPS in comparison to traditional illegal drugs. They recognised that an NPS would need to have a relative advantage such as psychopharmacological and subjective effects, legal status, availability or price over other NPS or traditional illegal drugs to diffuse successfully. The emergence of NPS as a result of the prohibition of traditional illegal drugs was also highlighted.

P1 (addictions psychiatrist) perceived that the biggest motivation for NPS use was the lack of availability or quality of substitutes. They stated that given the choice between identical traditional illegal drugs and synthetic equivalents, users were unlikely to choose NPS. Other interviewees also acknowledged this. Although the interviewee who worked as a toxicologist (P8) highlighted that there was an NPS to match each group of traditional illegal drugs; NPS were seen as representing 'poorer' versions with more unwanted side effects and less desirable effects. Following the PS Act, NPS will no longer be legal, cheap and easily available and therefore there was the suggestion that this will lead to a diversion to the traditional illegal drugs market especially for SCRA and natural cannabis.

Legality

Legality as a key relative advantage produced the largest divide in opinion among the interviewees. Some interviewees thought it had no effect on an individual choosing to use NPS, others suggested that legality was a decisive reason. Additionally, interviewees spoke of the disparity between different populations and the importance of interactions with the criminal market. Furthermore, the term 'legal highs' and the connotations of implying safety was a controversial issue. Interviewees also suggested that whilst legality may not be the main relative advantage of an NPS, its (previous) legality may have existed as a key secondary advantage.

For some, legality was a crucial reason for the diffusion of an NPS:

'you can avoid trouble with the police. I think it's valuable' (P3, Polish representative), *'it appeared important'* (P12, EMCDDA representative) and *'I think legality does, it does have a bearing'* (P16, government health department representative).

Those who perceived legality in this way were from a range of professions and it was interesting that they shared this view. For example, one interviewee who worked for a government health department held this view alongside an individual from the EMCDDA. The interviewee from Poland also shared this view and it was interesting to see the perspective of an individual internationally, in contrast to opinions regarding the importance of legality in the UK. Conversely, other interviewees perceived that legal status had no effect at all:

'I don't think it [legality] matters' (P2, public health impact coordinator), *'if people don't like the drug, they don't buy it again. Regardless of whether it's legal or became illegal'* (P8, toxicologist), *'even if it's illegal it [NPS] will remain popular'* (P9, ACMD representative), *'I don't think it [legal status] matters a damn... these drugs aren't used just because they're legal,*

you know that's one of the least important factors for people using substances' (P14, drugs charity representative), P18 (young people's substance misuse service representative) perceived that because of the legal grey area, the legal status of a NPS product makes *'no difference whatsoever... certainly for young people'*.

The individuals who perceived legality in this way were also from a range of professions: an individual from the ACMD, a toxicologist, a public health improvement coordinator and a young people's substance misuse service team leader. The contrast between individuals from academia and public health was particularly noteworthy. Other interviewees suggested legality as playing a partial role as a relative advantage.

Perceptions of legality importance for different populations

Legal status was seen to differ in importance for different populations. For example, current drug users were unlikely to see the legal status of an NPS as a significant relative advantage. Conversely, legality would be a key relative advantage for young individuals wishing to experiment with drugs without engaging in illegal activity. An interviewee, who worked for a drug charity which focused on students and drug policy, suggested that for students, legality would be an important relative advantage as use would not result in repercussions from the university.

P9 (ACMD representative) indicated that they thought following the PS Act, younger users would not wish to break the law and therefore would not engage in NPS use. Conversely, the interviewee who worked with young people (P18) suggested that the confusing legal status of NPS (before the PS Act was introduced) meant that young people did not see legal status as a relative advantage. Furthermore, P18 perceived that the illegal status of a product may encourage use by younger individuals who see it as 'more exciting' to break the law.

Legality as a secondary relative advantage

Interviewees identified the secondary advantages of legal status, which included accessibility and availability, and it may be the case that legality alone is not a key relative advantage but combined with other factors it becomes one. P20 suggested that:

'if you've got an option of two... equivalent substances that were going to have very similar effects and one of them is legal and one of them is not. And one of them you can buy on the high street and one of them you have to buy off a dodgy dealer. Then the legal one obviously has, in relative terms at least, an appeal' (P20, think tank representative).

The prevalence of SCRA in the USA was mentioned by P12, who suggested legal status of cannabis affected the popularity levels of SCRA. They asked:

'is it any surprise to us that you know some of the largest outbreaks related to synthetic cannabinoids have been in the states where they have some of the most prohibitionist policies towards cannabis in terms of the user level?' (P12, EMCDDA representative).

Perceptions of the importance of avoiding interaction with the criminal market through NPS use

The discussion around NPS legality involved the suggestion that individuals did not engage with illegal drug use because of their illegal status and therefore NPS allowed for not having to engage with the criminal side of purchasing drugs. This was perceived as applying to younger users of NPS. Incidentally, this was also recognised as a factor in older individuals using NPS who may not be aware of how to purchase traditional illegal drugs and do not wish to interact with the criminal side of drug purchasing.

P1 (addictions psychiatrist) perceived that the group who would find not engaging with the criminal market as advantageous would be a minority of people. However, P2 (public health impact coordinator), who had previous experience working with young individuals, suggested that for younger users not having to engage with this side and being available to purchase products from headshops would be beneficial. This was because they may not be familiar with or comfortable in engaging with this side of the market. The police representative (P10) stated that the younger population in the local area where they worked used NPS because they were legal and they would not get into trouble for purchasing or using them.

The notion of users believing that NPS products were 'safe' because they were legal and the way in which they were marketed was a contentious issue. Those who identified this alluded to it being the case for younger users or 'drug naive people' (P1, addictions psychiatrist). The idea of 'legal' meaning 'safe' is linked to the idea that younger individuals believe that because something is sold in a shop this legitimises them (P8, toxicologist; P13, international academic; P15, UK ministerial representative). It was interesting that both an academic and a ministerial representative highlighted the packaging and names of the products as potentially suggesting a safer product. The individual who worked for a charity (P4) focusing on the drug use of young people, suggested that whilst it is obvious to academics and individuals in drug policy that 'legal' does not mean safe, for some individuals, especially younger individuals and first time drug users, they may perceive a legal product as safe.

This view, however, was not consistently held: the think tank interviewee (P20) suggested that this was ‘not based on anything’ and described it as a ‘completely ridiculous perception’. The introduction of the PS Act will ensure that the idea of legality meaning safety will no longer be an issue. The interviewees acknowledged the difficulties in knowing the effects of change to legality following the PS Act; however the importance of legality will become apparent following the Act.

Availability

For the purposes of this analysis, availability is the ability to purchase NPS geographically, whereas accessibility is the ability to purchase NPS through headshops and online legally. Interviewees raised geographical factors in terms of certain NPS products diffusing successfully in certain areas and others failing to and the impact geographical location has on NPS choice. Interviewees also highlighted the availability of traditional illegal drugs, trafficking and supply routes as affecting the popularity of NPS. Overall, NPS were seen to need other relative advantages for successful diffusion, although the PS Act will have impact on NPS availability.

Geographical location will affect availability of different NPS and P3 highlighted the disparity between the popularity of methamphetamine in the Czech Republic and the popularity of amphetamine in Poland. Swansea was described as having a ‘banging mephedrone problem’ but Cardiff not, Barnsley having a ‘huge problem’, Manchester not (P1, addictions psychiatrist). This relates to geographical isolation: for some places it is not worth having a dealing network for a particular drug (P1).

P13 (international academic) perceived that the ‘pretty strong’ availability of traditional illegal drugs, especially methamphetamine and amphetamine, in Australia has meant that NPS have not become widely popular despite Australia existing as an isolated island. However, in more isolated parts of a country, availability was likely to be more important. The disparity between NPS diffusion in different locations was also recognised as occurring for alternative reasons, for example trafficking but also the history of the drug. SCRA were popular in Washington DC and synthetic cathinones were popular ‘particularly’ in Florida (P5, international EWS representative). The interviewee perceived that the popularity of cathinones in Florida was due to south Florida acting as an entry point for chemicals arriving from China.

The individual from New Zealand perceived that availability was the key relative advantage for a NPS diffusing in New Zealand; they explained that especially for ‘novice users’ they would take:

‘whatever the hell they can get their hands on... they will take whatever’s available’ (P17, international drugs charity representative).

The police representative perceived that following the PS Act it would be products that are available which will be popular. When asked why users may choose to use NPS, the ACMD interviewee (P9), perceived that it was because they were widely available. The importance of availability for younger users was suggested by P18 who explained that the young people presenting themselves to their substance misuse services using NPS did so because the products were available and therefore they will be used. This will continue following the introduction of the PS Act. Other interviewees however, suggested that there needed to be more factors than only availability for a product to diffuse.

Accessibility

Similarly to legality, interviewees perceived the importance of accessibility affecting different populations and the importance of headshops and online markets varying between countries. The role of accessibility of NPS before the PS Act and the impact of the Act on accessibility was mentioned by all the interviewees. However, views relating to previous accessibility varied. The stated policy aim of the PS Act was to limit access and to close headshops and this would suggest that policymakers saw accessibility as a key reason for NPS use.

The EMCDDA interviewee (P12) stated that, from their perspective, accessibility was the key relative advantage for NPS use from applying the notion of being able to walk into a shop and purchasing a product without restrictions from other models to the NPS market. P16 (government health department representative) perceived that although there was a complex relationship, there was a relationship between access and use. Additionally, opportunity was perceived to have played a role in NPS use, but it was not the sole role. However, one of the charity representatives (P14) questioned the importance of accessibility and stated that despite NPS being previously legal and accessible, accessibility will only be important if the substance is one which people enjoy and want to use. Additionally, interviewees highlighted the PS Act being implemented in Ireland with the closure of headshops and yet use of NPS increasing.

Perceptions of accessibility importance for different populations

For certain groups, accessibility of NPS from headshops or online represented a particular relative advantage. For example, P1 (addictions psychiatrist) suggested that older users were using SCRA because of accessibility as opposed to interacting with the criminal market of traditional illegal drugs. The importance of accessibility in being able to purchase NPS from headshops, especially for vulnerable populations using SCRA and younger populations experimenting, was recognised. When speaking about headshops, interviewees frequently mentioned the terms ‘opportunity’ and

‘convenient’ to describe this type of NPS use especially among young people. P8 (toxicologist) suggested that the closing down of headshops through the PS Act should eliminate opportunistic purchasing.

However, P11 (journalist) suggested that the closure of headshops through the PS Act would only move the purchasing of NPS by problematic users and vulnerable groups underground. Individuals able to purchase NPS products from the online illegal markets may do so and those not able to do this may purchase available NPS products from the illegal street market. Furthermore, not all NPS are sold from headshops. Therefore, the impact of the PS Act on closing headshops is unlikely to affect the popularity and supply of NPS fentanyl, for example, which are not sold in the shops. Yet, the importance of accessibility of SCRA was seen as an important factor in their diffusion.

The interviewees from one particular city all referenced the headshop in the city centre as affecting the popularity of NPS and suggested that following the introduction of the PS Act that (visible) NPS use had decreased. One interviewee from this city worked as a public health specialist (P6) and perceived the use of NPS in the city to being ‘rather specific’ to that shop. The police representative working in the same city also stated that:

‘as soon as we closed this one outlet down, which was the only outlet we had, it [use] drastically reduced’ (P10, police representative).

The role of headshops and the online market

The representative from the EMCDDA (P12) perceived that, in some countries, headshops had played a critical role in increasing NPS availability and use but this was not the case for all European countries. The interviewee from Poland (P3) spoke of the large number of headshops in Poland and stated that in 2010 1400 shops were present in Poland. As these shops closed, the internet became more important as a place to purchase NPS. The interviewee from New Zealand (P17) was able to speak about the effects of headshops on the popularity of NPS in New Zealand and how use was affected by their closure. They explained that before legislation came in there was about 4000 retail outlets selling NPS in New Zealand and they existed in an ‘absolute free’ commercial market with no age advertising restrictions. They explained that in the first three years of BZP being sold in retail outlets without restrictions that a quarter of the adult population had tried the substance and accessibility without controls did play a key role. The interviewee spoke about how, from their perspective, the closure of the shops had affected use and they highlighted the benefit of restricting use for ‘novice users’. P17 also explained that the closure of shops had led to a black market for NPS forming.

There was disagreement among the interviewees as to the importance of the online market before the PS Act was introduced, especially in comparison to headshops. Questions surrounding the darknet were not directly asked but a number referred to its role in NPS use and its importance in terms of accessibility. Interviewees suggested that following the PS Act, the darknet and cryptomarkets were likely to have an increasingly important role. However, currently, interviewees acknowledged the lack of NPS popularity through the darknet and the small percentage of cryptomarkets users in general. Although, very specific NPS were more likely to be purchased through the darknet than a street dealer. The think tank interviewee (P20) perceived that barriers were being broken down and the cryptomarkets were now ‘really quite easy’ to access and their use was increasing. Other interviewees however, suggested use was still restricted to individuals with technological expertise. The PS Act will allow for an insight into how important the accessibility of NPS has been in their use.

Lack of detection

This relative advantage was mentioned mainly relating to the prison population although it also extended to other populations. However, it was acknowledged that it was unlikely to be a key relative advantage for the UK general population because of limited drug testing.

NPS use in prisons was mentioned by the majority of interviewees. The prison population represented a different social system and therefore different relative advantages would be more important. This was mainly recognised, although not limited to, the lack of detection in traditional drug tests which NPS provide. P20 suggested that their prominence in the UK had come about because of the prohibition of natural cannabis:

‘that [SCRA prevalence in prisons] is a nightmare entirely of our own making. That those products would never have existed if cannabis had been legalised you know a generation ago and properly regulated’ (P20, think tank representative).

Other reasons for NPS use in prison included the ability to ‘kill time’, the potency of NPS at low doses, entertainment purposes and a lack of SCRA scent. In Australia and the USA, drug testing was more common and therefore its role as a relative advantage was likely to be more important. The importance of a lack of detection as a relative advantage is likely to differ between current drug users and experimenters. For current users, the lack of detection is unlikely to be important unless the use of NPS is in lieu of traditional illegal drugs.

Purity

When interviewees discussed purity as a relative advantage it was mostly as a secondary factor combined with another relative advantage such as price or legal status. This was mentioned especially in relation to the diffusion of mephedrone. Mephedrone appeared at a time where there was low purity MDMA and cocaine and contrastingly, mephedrone was seen as having consistent and reliable purity.

It was highlighted that purity as a relative advantage was likely to be more important in relation to the purity of other substances available at the same time. Interviewees highlighted the decrease in popularity of mephedrone coinciding with the return of higher purity traditional illegal drugs. They questioned whether mephedrone would have diffused successfully had there been high levels of purity of MDMA and cocaine. Interviewees suggested that purity of NPS was likely to decrease following the PS Act as products become available on the illegal market. However, the toxicologist (P8) interviewee highlighted the challenges in knowing accurately the purity of an NPS product as the ingredients may vary significantly between products and batches. P11 (journalist) suggested that purity would be unlikely to be an important relative advantage as there is a 'lack of care' about the contents of NPS by users.

Price

Every interviewee mentioned price and how this would affect innovation diffusion. For some interviewees, price was a primary relative advantage but for others it was more a secondary factor which would need to be combined with a primary relative advantage to have an important role.

One of the interviewees stated that:

'price is king' and 'absolutely vital around people's decisions' (P17, international drugs charity representative).

One government health department representative (P7) perceived that the key factor in a NPS diffusing is price to value by both users and the market. P1 (addictions psychiatrist) also perceived that if an NPS was cheaper, then this was the most effective method of entering the market. P2 (public health impact coordinator) suggested that price was likely to have played a role in the popularity of SCRA being sold in shops as they were especially cheap.

Conversely, P9 (ACMD representative) questioned the importance of price as a relative advantage and its impact on the diffusion of an NPS. In contrast to the interviewee from New Zealand, the interviewee from Australia (P13) questioned the importance of price in Australia especially for

SCRA, as cannabis was a low price and SCRA were comparatively more expensive. They suggested that, however, if an NPS was ‘ridiculously cheap’ in comparison to its traditional illegal counterpart then this would likely impact on popularity. Although this highlights the role of price, it also emphasises the importance of availability of alternatives.

Generally, NPS were seen as cheaper than traditional illegal drugs but some interviewees acknowledged that traditional illegal drugs were not noticeably more expensive. Interviewees from a range of professions suggested the importance of price as a relative advantage. Yet it was also acknowledged that certain populations would be more price sensitive and that this would be particularly advantageous, for example for the young population and vulnerable groups. Groups who had lower incomes, but also groups who may use the products more frequently, would be more affected by price. It was perceived that the PS Act would be likely to lead to an increase in price of NPS as the risk of selling increases.

Psychopharmacological effects and side effects

The interviewees perceived that one of the key relative advantages would be psychopharmacological effects of the drug and personal preference for a drug. Many spoke about mephedrone as a drug successfully diffusing. They mentioned many reasons for this diffusion but also stated that it was key that the drug had an effect which users liked, which was similar to MDMA, and this is also why popularity had endured. Additionally, a couple of interviewees spoke of the need for an NPS to have minimal side effects, or at least the positive psychopharmacological effects needed to outweigh the side effects.

The effect profile of an NPS needs to be a relative advantage to users in acting as an alternative to traditional illegal drugs and also alone. For example, SCRA were seen as having more negative side effects than cannabis and therefore from this perspective, may not be seen by users as having a relative advantage over cannabis. P1 described NPS as:

‘less impressive versions of their various counterparts’ (P1, addictions psychiatrist).

If an NPS does not have desirable effects then it is unlikely to diffuse beyond the initial experimentation by users. The psychopharmacological effects were seen as a key relative advantage in the sense that even if an NPS is widely available and cheap, if the product does not meet the needs of the user then they are unlikely to continue use. The majority of interviewees perceived the importance of the psychopharmacological effects of NPS to closely resemble the traditional illegal drugs in order to successfully diffuse. P11 (journalist) suggested that an NPS which had a similar effects profile to MDMA and was ‘good’ and safer would be likely to diffuse as successfully as

mephedrone. The positive psychopharmacological effects need to have a relative advantage of outweighing the negative side effects to justify use. Psychopharmacological effects were perceived as being more important than purity of an NPS by P11 (journalist) and P12 (EMCDDA representative) suggested that users were not concerned about the brand of NPS; their focus would be the psychopharmacological effects.

When asked about diffusion following the PS Act, the toxicologist interviewee (P1) explained that diffusion will occur depending on their pharmacology ‘more than anything else’. P10 (police representative) stated that one of the service users that attended their treatment services used NPS simply because they liked it and the PS Act would be unlikely to impact their preferences. Similarly to the retailer interviewees (Study Two), the effects of a product were seen as key to the diffusion of a product and the PS Act would be unable to affect this.

Other reasons

Interviewees also acknowledged other factors affecting the diffusion of an NPS. For example, the attribute of level of addiction as a reason for NPS diffusion was raised. The interviewees spoke of the level of addiction of a drug especially mephedrone as a ‘moreish drug stimulant’ (P1, addictions psychiatrist) and of SCRA (P13, international academic; P19, police representative). However, whilst mephedrone, which was mildly addictive, was a positive reason why people may adopt the innovation, for SCRA and also the opiate AH 7921, it was negative. The level of addiction associated with a substance is likely to impact on the effectiveness of the PS Act.

Trends

NPS may diffuse for reasons beyond the innovation itself. For example, interviewees recognised the role of trends in why certain products diffused and became popular whilst others failed to do so. Popularity for different substances were perceived to ‘suddenly build up’ and become a ‘trend’ and a ‘fad’ (P19, police representative). Conversely P8 (toxicologist) stated that substances, from their perspective, ‘go out of fashion’ and used the example of ‘glue sniffing’ as an activity which, through campaigns, had become ‘uncool’. Additionally, a theme which emerged was the role of market forces, highlighting the existence of NPS in a market similar to other consumer products. It was noticeable that only a few interviewees highlighted the role of economics but those who did stressed its importance. Two interviewees suggested that economics is ignored too much in drug research and by addressing this there may be a better understanding as to how to intervene.

The interpreted importance of the innovation itself and especially the associated relative advantages by the professionals can be perceived as a key aspect of the diffusion of NPS.

Communication Channels

Communication channels form the second part of the DOI; they are the mass media and interpersonal channels. The media was mentioned frequently, online forums were discussed by interviewees who had knowledge about the forums but the role of offline friendship networks as a communication channel was mentioned the least.

Mass media channel

NPS in the media

The majority of interviewees had strong opinions on the relationship between the media and NPS. However, in relation to the DOI it is important to focus on the role of the media as a communication channel and its role in providing awareness and influence on individuals choosing to adopt an innovation.

The appearance of NPS in the media was acknowledged as being prominent. This disproportionate focus on NPS was seen as introducing individuals to NPS and advertising that they were (before the PS Act) available legally and this was recognised especially for young people. This related to the use of the term ‘legal highs’ by the media which was viewed negatively, most noticeably by the senior police interviewee (P19) and the UK ministerial representative (P15). Whilst the media was criticised for misleading stories surrounding NPS use, in relation to SCRA, P1 (addictions psychiatrist) was the only interviewee who suggested that stories were relatively accurate and hoped that this would reinforce the message of their danger.

Perceptions of the media as a communication channel in affecting the diffusion of NPS

Interviewees spoke about the role they thought the media had in affecting the diffusion of products; the use of Google Analytics was frequently mentioned. Although attributing a direct link was questioned. Nevertheless, the impact of the media as a communication channel was not underestimated.

P3 (international ministerial representative) perceived that the media ‘have impact’ and P8 used the phrase ‘there’s no such thing as bad publicity’ to explain the reporting NPS by the media which has meant that NPS are:

‘kept constantly on the attention of young people... it certainly does nothing to diminish the use’ (P8, toxicologist).

The use of Google Analytics to highlight the increase in Google searches for a particular substance following a negative media story (Forsyth, 2012) was mentioned by a number of interviewees to suggest that the media does have an effect on the popularity of a substance. In addition, the role of the mass media as a communication channel in raising awareness of NPS was acknowledged by P4 (drugs charity representative) but they suggested that the media would be unlikely to have influence on the use of specific drugs. P12 (EMCDDA representative) conversely suggested that the media would raise awareness and shape opinions about NPS and whether to adopt. In 2009 and 2010 when mephedrone was diffusing in the UK, the media was seen as playing a role in diffusion:

'not only were they [the media] promoting it [mephedrone] through their reportage but also because of the nature of the internet they were actually providing direct links to suppliers of it' (P14, drugs charity representative).

However, confirming a direct connection between media stories and increased NPS use is difficult (P12, EMCDDA representative). In Australia, P13 (international academic) attributed the popularity of SCRA among miners in Western Australia to the media reporting that the products would not be detected by drug tests. Google trends at the time showed an increase in online searches for the products and the fact that the story was on the front cover of the tabloid newspapers had a large impact. This example highlights the role of the media as a communication channel and a key relative advantage forming the basis for an increase in popularity of an NPS.

Through reporting the danger of NPS consumption and therefore the strength of the products, the media was perceived as doing 'some very good advertising' for the retailers (P7, UK governmental health department representative). Intentional harm reduction through advertising the dangers of strong NPS can be:

'a red rag to a bull, they're going to go out and buy that substance' (P13, international academic).

The media in this form as a communication channel is likely to affect a different adopter category in terms of NPS awareness to the category who are made aware of NPS for the first time through media reports. The media was described as being an important source of information for *some* people (P6, public health specialist) and this is important to recognise; the media is likely to have varying influences as a communication channel for different adopter categories. In New Zealand, before BZP was banned, the media:

'drove people into the stores to stockpile all these things and shops were having firesales' (P17, international drugs charity representative).

The mass media as a communication channel in this context is again likely to be important to a different adopter category than introducing users to NPS. Also it will be different to experienced NPS users who are likely to have been aware of the introduction of the BZP ban. Finally, existing NPS users are unlikely to be affected by media headlines as they will relate the story to the individual as opposed to the substance. Interestingly, this was observed by two individuals in extremely varied professions: an addictions psychiatrist and a senior police representative.

Interpersonal channel

Interpersonal communication channels in relation to NPS are offline friendship networks and online NPS forums. Rogers (2003) explained that the essence of the communication process is the exchange of information about an innovation between an individual and individuals who have not adopted the innovation. There were different opinions regarding the importance of friendship networks and online forums. This especially related to the different NPS user groups.

Friendship networks

Of all the communication channels, friendship networks were spoken about the least. This may relate to the focus of the questions on the novel nature of NPS and consequently the focus on the role of online forums and the media which frequently refer to NPS as opposed to offline friendship networks. The importance of personal experience and social norms related to the effect that the interviewees thought that these two aspects of interpersonal channels had on the diffusion of an innovation. The importance of friendship networks was perceived as especially relating to young people:

'young people definitely listen to their friends when they're making decisions to use drugs' (P4, drugs charity representative) and *'if their mate tells them it's safe they might still take it'* (P10, police representative).

In contrast to formal NPS education (e.g. school based curricula), interviewees highlighted the role of friends providing feedback to influence a decision to choose an NPS. Peer opinion was seen as affecting which product individuals choose to use but the role of face-to-face social networks was described by P12 (EMCDDA representative) as 'badly studied' in relation to NPS. However, they were perceived as being incredibly important by P14 (drugs charity representative) who explained that traditional supply networks involve a more 'amorphous network' where most people who buy drugs, do so from friends or acquaintances.

The role of social norms was also recognised by the interviewees:

'if the social norm of the group or groups you belong to is to use substances then the likelihood of you to use them is more' (P7, UK government health department representative).

The role of peers and social factors were described as being the 'drivers' for drug use status by one drugs charity representative (P14). The importance of offline friendship networks as a communication channel was highlighted by the interviewees in relation to the social aspect of drug use. Physical friendship networks were seen as important because a high proportion of drug users choose to use drugs with their friends or share their drugs. This also extends to the family and the interviewee who worked as a young people's substance misuse service team leader (P18) suggested that it may become 'normal' to take a substance which is around at the time. The role of social norms was recognised by interviewees in a variation of professions which was interesting; whilst interviewees working in charities highlighted this, it was also recognised by an interviewee from a UK government health department.

P18, who worked with young people, did acknowledge that the majority of young individuals presenting themselves to their services were involved in a friendship network where there was engagement in similar practices. In addition, interpersonal communication channels can act to disseminate a dangerous NPS or a harmful NPS practice among friendship networks. For example, mephedrone injecting was described by the addictions psychiatrist interviewee (P1) as a 'really localized phenomenon'.

The journalist interviewee (P11) stated that offline friendship networks were more important than online networks as these forums are small and the majority of individuals would be more likely to be influenced by their friend than an 'online stranger'. In contrast, the international drugs charity representative (P17) suggested that online interpersonal communication channels have a wider reach but peer groups are still important albeit on a smaller scale. P16 stated that, from their perspective, the importance of online and offline communication channels will differ between individuals:

'for some people they [offline friendship networks] will be, for some people they won't be. I think you know the influence and advice of someone that you know and trust is still powerful, but obviously there's just loads of stuff out there on the internet isn't there?' (P16, UK government health department representative).

Online Forums

Online forums represent a merging of interpersonal channels and the mass media. The use of online forums as a communication channel was identified by the majority of interviewees. It was

acknowledged that online forums had become more important especially in the emergence of NPS although their importance differed between user groups.

The forums act as a communication channel as they allow people to access and discuss information on NPS. The interviewees spoke of the varying importance of the forums for different populations and products; individuals purchasing NPS products opportunistically were unlikely to be using forums to the level of psychonauts. The online forums were seen as being more important for NPS users in comparison to traditional drug users because:

'the information gap is greater... if you want to know about them, the only source of information is the user forums' (P8, toxicologist).

Online forums as a harm reduction resource

There was a focus to discuss the forums as beneficial harm reduction resources for NPS users. This in itself highlights the perceived importance of the forums and perceived accuracy of the forum material. The importance of the online forums as harm reduction resources was perceived as a response to the lack of access to other harm reduction material. Harm reduction on the forums comes in the form of entries discussing doses, effects and experiences and these are likely to influence individuals in adopting or rejecting an innovation. The interviewees who spoke about the forums viewed them very positively:

'they're often the best, often the best place to understand the potential harms of these products' (P17, international drugs charity representative).

Nevertheless, the inconsistencies were acknowledged by the interviewees:

'how reliable the data is, is a different matter, but that's all there is' (P8, toxicologist).

Interviewees raised the point that this may be due to individuals commenting on forums and not being sure which NPS they have actually taken. Recently there had been a substance which, perhaps due to individuals unintentionally using different products:

'seems to be absolutely split down the middle, half of them love it and the other half hate it' (P8, toxicologist).

Perceptions of online forums as a communication channel in affecting the diffusion of NPS

Interviewees suggested that forums talking about a new product would have an influence on people choosing to adopt or reject that product:

'if somebody puts that it's good stuff... it's like the trend setter' (P3, Polish representative), *'I think the internet's been... how popularity grows for one or the other. Absolutely important'* (P9, ACMD representative), *'I think also it gives a pretty good indication of whether the drug will disappear or not'* (P8, toxicologist) and *'they identify new substances as they come up and they're one of the reasons why you know products may pick up in popularity or otherwise'* (P14, drugs charity representative).

This role of the online forums in affecting the diffusion of an NPS was recognised by interviewees in a range of professions which was interesting. This view was held by an interviewee who was a toxicologist, a member of the ACMD, an individual working in a drugs charity and a public health improvement coordinator. One of the interviewees worked in academia, with a focus on digital technologies, explained that Bluelight, an online forum dedicated to the discussion of drugs, and similar forums have been described as:

'leading edge indicators of drugs trends... you might find the first mentions of some of these drugs happening on the online forums... in that sense they can be one of the first to peak people's interest or to host a sort of an initial thread, and initial experiences' (P13, international academic).

Interviewees mentioned the monitoring of forums by surveillance systems which suggests that they are important in assessing whether a NPS product will diffuse or not:

'with [National NPS Early Warning System] we do, we are working with a colleague... at the Medical Examiners office and he does regular internet scans for us to look for information to alert us to what's showing up on the forums' (P5, international EWS representative).

However, one interviewee suggested that forums in the past were:

'a great place to launch products and generate a buzz' but moderators had now become *'wise to it'* and this was happening less (P11, journalist).

P13 (international academic) perceived that even if an NPS became popular and written about on an online forum, they did not become popular in a 'broader community'. The interviewee suggested that this may be owing to individuals not using online forums so they are not made aware of particular NPS. Whereas mass media as a communication channel can reach a wide audience, this appears not to be the same for interpersonal channels. One interviewee stated that the importance of online forums as a communication channel was dependent on the NPS. For example for SCRA, direct marketing and availability through headshops or internet shops had been more important than specialist forum discussion in driving their popularity (P12, EMCDDA representative). The varying importance of online forums for different populations is explored in the next section.

Perceptions of the importance of online forums for different populations

When discussing online forums, the interviewees highlighted their varying importance for different NPS users. P1 (addictions psychiatrist) explained that forums include a range of individuals on different forums with different levels of knowledge and interests and motivations. Younger users in particular were recognised as benefitting the most from the forums. This is likely to relate to their supposed lack of experience and therefore forums allow younger individuals to obtain as much information as they can before taking a substance. The forums therefore act as a communication channel through conveying the positives and negatives of different NPS and then an individual can decide whether to adopt or reject the innovation.

However, the journalist interviewee (P11) questioned the level of younger users using the forums and suggested use was mainly individuals over the age of 30. Users of online forums were likely to include psychonauts and P9 (ACMD representative) suggested that the forums would be especially important for this group but questioned the wide use by the general population. One interviewee perceived that some users of online forums:

'know more about the drugs than we [the forensic service] do' (P8, toxicologist).

The interviewee with experience in studying digital technologies explained that on Bluelight there were on average 9000 active posters a month, with about 300,000 members. However, the challenge in quantifying the influence of online forums as a communication channel in persuading individuals to reject or adopt an innovation was recognised. P13 explained that these users of the online forums were broken into a 1, 9, 90 rule:

'there's 1% of an online community they're the super users. They're the ones doing... the bulk of the postings... they're the super users also they'll have most of the control, moderators, administrators. And 9% who are doing the regular, run-of-the-mill sort of stuff. And 90% are lurking and not saying anything at all' (P13, international academic).

Social media and solo drug use

The role of social media, especially for young people, was mentioned by few interviewees. This included YouTube and Facebook but these were not discussed in great depth. Social media can be seen as the merging of the two communication channels: the mass media channel and the interpersonal channel. One of the police representatives (P19) perceived that social media had the ability to 'turn something into a trend'. P6 suggested that social media may be more important than traditional media as a communication channel. However, the interviewee with experience in studying

digital technologies (P13) addressed the role of Facebook in the diffusion of NPS and was unsure as to whether this was used as a communication channel for NPS diffusion.

The interviewees also recognised that the online forums had led to an increase in solo drug use. For this group of users engaging in solo drug use, the importance of interpersonal communication channels and social use would not be as important. Although issues of potential harm arise.

Homophily and Heterophily

A further aspect of Rogers' theory's communication channels component involves heterophily and homophily. Homophily is the 'extent to which two or more individuals who interact are similar in certain attributes, education, social status and the like' (Rogers, 2003: 19).

The reference by interviewees suggesting that users would use NPS products in social situations would suggest that there is a high level of homophily. Certain populations using particular products, such as SCRA among vulnerable populations, would also suggest homophily. However, NPS users were seen as varying greatly and therefore being more heterophilous. Users of online forums were described by P18 (young people's substance misuse service team leader) as having similar characteristics but which contrasted greatly with the service users they were interacting with. Furthermore, P14 (drugs charity representative) stressed that NPS should not be seen as a 'homogenous group of products' and therefore users should not be seen as having high levels of homophily as they will have different motivations for use.

Although friendship networks were not explored to the extent of online forums and the media, their importance in affecting drug use cannot be ignored. Furthermore, the importance of online forums and the media was perceived to extend to different groups. Online forums are likely to have greater influence as a communication channel among individuals who are more engaged in drug use and obtaining information about use. Conversely, the media is likely to have greater influence among individuals who are less engaged in drug use but are made aware of products through media coverage.

Time

Rogers identified five different adopter categories: *innovators*, *early adopters*, *early majority*, *late majority* and *laggards*. The interviewees spoke about NPS user groups in general terms and did not determine which adopter group they thought each user group belonged to. For particular groups, the appropriate adopter group was clear but for other user groups it was less obvious.

The NPS user groups in the UK were described by P3 (international ministerial representative) as ‘quite specific groups’ which was noticeable as this was the perspective of an individual who did not live in the UK but perceived the user groups in their own country as not as distinct as in the UK. Motivations will be different for different user groups of NPS such as young individuals experimenting, users of traditional drugs and vulnerable groups. Therefore the interviewee who worked for a drugs charity (P14) stressed frequently during the interview that NPS users should not be described as ‘homogenous’.

When discussing users of NPS as experimenters this included psychonauts at one end of the spectrum and young individuals at the other. Young individuals were identified as users of NPS products who wanted to experiment with the latest invention and were likely to experiment once and then only continue use if the experience was enjoyable. Other user groups identified included the LGBT community, older user groups and user groups who made the decision to use NPS to avoid detection in drug tests such as those seeking employment or individuals working in certain occupations.

Innovators

When asked about user groups, psychonauts and their characteristics were frequently mentioned by the interviewees. In relation to Rogers’ DOI, psychonauts can be recognised as innovators.

Psychonauts were described as:

‘new drug frontier, pioneer type people’ (P6, public health specialist), *‘who will try anything new, just for the sake of registering what sort of experience they get’* (P9, ACMD representative), *‘someone who is... exploring the use of psychoactive substances’* (P12, EMCDDA representative), *‘there’s a crew of people that are just really curious about different compounds... for those people they’re going to seek out the new research chemical more’* (P13, international academic) and *‘that contingent that will try something new for the sake of it because it’s different and new’* (P13, international academic).

They were described as having a vast knowledge of drugs (P11, journalist) and being an older group of users. These descriptions of psychonauts are similar to those used by Rogers to describe innovators

such as seeking out new innovations and individuals who are risk takers. It was noticeable that the interviewees who described characteristics of psychonauts came from a range of professions which was not limited to academics but also included a public health specialist, a journalist and a member of the ACMD. The interviewee from the EMCDDA (P12) spoke in great detail about psychonauts and their characteristics.

This user group was seen as being a small group, and Rogers suggested that the innovators group would comprise approximately 2.5% of the social system. However, they were identified by P11 (journalist) as being a niche group of NPS users distinct from users of traditional drugs. The vast majority of NPS products were seen as diffusing only to the point of psychonauts and not beyond. Following the implementation of the PS Act, it was suggested that the psychonaut group would be one of the groups who would continue to use and seek out NPS products especially hallucinogens.

One of the research questions for this thesis involved identifying which of Rogers' adopter categories might be most at risk of harm from NPS use. Innovators are described as playing an important role in influencing NPS users through communication channels and psychonauts have an important role on the increasingly popular online forums. This is in terms of their experimentation and ability to offer harm reduction advice related to dosage and potency of new products. Perhaps therefore, the safety of psychonauts was not viewed as a concern by two of the interviewees:

'there are your psychonauts who are just experimenting so that's fine' (P1, addictions psychiatrist) and *'I'm less concerned about the safety of that group'* (P13, international academic).

The representative from the EMCDDA (P12) however suggested that there was a difficulty in identifying when exploration and recreational use becomes 'problematic recreational drug use'. Of the adopter categories, the psychonauts as a group best represented one of Rogers' categories.

Early adopters

For other adopter categories identified by Rogers, the groups were less obvious, however it is still worthy to speculate as to which adopter categories may be represented by NPS user groups. In terms of early adopters, an interviewee described the use of NPS in a clubbing setting by clubbers as individuals tending 'to be early adopters of substances' (P8, UK government health department representative). Yet this may only be appropriate for the use of synthetic cathinones.

Whilst users in a clubbing setting may be early adopters, the actual prevalence or increase of NPS use in this setting was questioned (P14, drugs charity representative). Early adopters are key to the diffusion of an innovation and it is questionable whether this is applicable to clubbing setting users.

This may be owing to the wide range of NPS products and the different motivations for use but also the variety in NPS user groups, for example the use of SCRA by prisoners to avoid detection and the use of a hallucinogenic NPS by a psychonaut to experiment. Early adopters as users in a clubbing setting may be applicable in relation to synthetic cathinones, but their role and influence may not extend to other NPS products.

Early majority

Younger individuals may be the early majority adopter category in Rogers' DOI. The early majority take longer to make a decision to use an innovation and do so because of curiosity or persuasion by innovators and early adopters. The difference between the two experimenter groups, psychonauts and younger individuals, and their motivations for NPS use was highlighted by P18:

'when you read on the forums, it is really intellectualized... a substance is being picked for a particular effect or a reaction at a particular dosage... It is very different to what we see for our young people walking through the door' (P18, young people's substance misuse service representative).

Younger individuals being NPS users was suggested by the majority of interviewees, including in Poland (P3, international ministerial government representative), in addition to specifically vulnerable and disadvantaged younger individuals. It was also suggested that younger individuals might experiment with NPS but use might not become established. P17 stated that in New Zealand following the implementation of their legislation, the result was younger and novice users could no longer:

'walk into a shop and get their milk and NPSs at the same time' (P17, international drugs charity representative).

The interviewee who worked in a young person's drug treatment service (P18) believed that in their city, there was not large numbers of young people using NPS currently except for a 'steady trickle' of young people using SCRA. Although this is only one view and from one location in the UK, it is interesting that an individual working specifically with young people said that use was not particularly high among this cohort.

Late majority and laggards

The adopter categories of the late majority and laggards were more challenging to identify. Both categories may be represented by problematic users, prisoners or vulnerable people including

vulnerable young people who adopt an NPS product through economic pressure as the late majority and laggards are described as having low socio-economic status.

The late majority adopter group share similar characteristics to the early majority and value the opinions of others whilst laggards will resist the innovation until they have strong evidence for use. It was suggested that the vulnerable older and younger users of NPS would be using headshops to purchase their products because of their opportunistic element and vulnerable people were likely to:

'just use what's there at the time and what's cheap... that may just be that that's NPS' (P19, police representative).

Prisoners and use of SCRA has been frequently alluded to in discussions surrounding NPS in the UK, for example Blackman and Bradley (2017) and Ralphs et al (2017). Prisoners who have left prison were also identified as problematic users by one of the police interviewees. Identifying the appropriate adopter category for prisoners is challenging. Although the use of SCRA in the prison population is prominent, it is unknown as to what proportion of the whole social system this represents and the influence of others on an individual's innovation-decision process.

In a similar manner to the critical analysis (Study One) and the retailer interviews (Study Two) identifying adopter categories from the interviews with professionals was challenging. The interviewees were not asked to identify user groups from the different descriptions of Rogers' adopter categories; nevertheless, the adopter category of innovators representing psychonauts was apparent.

Social System

The fourth part of Rogers' DOI is the social system, and the two key actors are change agents and opinion leaders. Interviewees were not asked explicitly about the existence of either of these actors but some interviewees alluded to their existence.

Change agents

In terms of change agents, P12 (EMCDDA representative) stated that they were aware of the existence of marketing techniques employed for individuals to write fake product reviews in an attempt to influence the adoption of an innovation. P1 (addictions psychiatrist) suggested that there were possibilities that online retailers were using change agents to influence forum users to try a new NPS. P13 (international academic) also stated that they thought there would be individuals used by retailers to promote particular NPS because there was nothing stopping them from doing so, although they had not seen this occurring. However, on Bluelight there were moderators to ensure there was no promotional material published, yet this may be challenging to identify. On the darknet markets, it was suggested that change agents may be more prominent because of the attention to make profit:

'where there is profit to be made and good wills and good intentions can be side-tracked'
(P1, addictions psychiatrist).

This is in comparison to drug forums which were suggested to have more of a harm reduction focus.

Opinion leaders

In terms of opinion leaders, interviewees agreed that there was likely to be certain individuals in forums who have influential opinions. However, the EMCDDA representative (P12) urged caution in assessing how influential opinion leaders were in promoting sales of particular products. Characteristics of opinion leaders on online forums are likely to relate to the nature of their forum posts and whether they convey a high level of experience in the area of NPS. P4 (drugs charity representative) perceived that opinion leaders were likely to be individuals who built up a following or a reputation on the forums and how the individual conveyed themselves. P4 also suggested that the nature of the post will influence others' innovation decisions:

'if it's [a post] really long, if it's quirky and it's funny, I think people are more likely to respect that opinion' (P4, drugs charity representative).

Opinion leaders need to be able to convey they have experience in the area of NPS and are authoritative on the issue.

Study Strengths and Limitations

There are many strengths associated with conducting qualitative research. Conducting interviews was beneficial in that they offered the opportunity to obtain the perceptions of some individuals who were professionals involved in the introduction of the PS Act at the time that it was introduced or being introduced. The majority of interviews were conducted as telephone interviews or audio Skype interviews. The advantages of these forms of interviews include the geographical reach and lower expense which they allow which was necessary for the interviews with professionals in countries such as New Zealand. Access to professionals became simpler through arranging a telephone interview in contrast to attempting to arrange a face-to-face interview because of the full schedules of the interviewees.

A further strength of this research was the wide range of interviewees whose insights were explored. This was possible through the purposive sampling technique. The geographical reach of the interview forms meant that the interviewees were not restricted to the UK and therefore opinions of individuals from countries with a key interest in NPS could also be heard. Goldstein (2002) highlighted the importance of obtaining information from a range of interviewees with different vantage points. The rationale of the use of purposive sampling lies in 'selecting information-rich cases, with the objective of yielding insight and understanding of the phenomenon under investigation' (Bloomberg and Volpe, 2016: 148). Although this sampling strategy reduced the ability to generalise from the data, Bloomberg and Volpe (2016) explained that the intent of the researcher is to describe a particular context in depth and not to generalise.

It was important to include a range of professions who would have differing views on the PS Act to try to include as many perspectives as possible. In practice this meant that interviews were undertaken with participants who were involved in the development of the Act (e.g. civil servants and policy advisors) and individuals who would be affected by the Act (e.g. retailers and law enforcement representatives). Lilleker explained that although there are difficulties in conducting interviews in this setting, 'no one is able to offer the level of knowledge of an issue or aspect of government as one deeply involved within that area' (2003: 213). Finally, a strength of conducting interviews with professionals was that they could be compared and contrasted with the findings of the retailer interviews (Study Two) to give a further insight into the NPS market and the PS Act.

In terms of limitations, conducting interviews through the telephone or audio Skype had weaknesses. Originally, there was the intention to conduct the interviewees consistently as phone interviews. However, because there was a change in the research sample to include international individuals, this

was not practical. The most obvious limitation is the lack of visual communication which is offered by these methods.

The issue of reliability is a limitation associated with conducting elite interviews. This can become apparent in different forms. Reliability is the extent to which the research findings of a study can be replicated by other similar studies (Bloomberg and Volpe, 2016). To increase the reliability of this study, consistent coding schemes and categories were used during the analysis of both sets of interviews. Furthermore, during this research a purposive sampling frame was implemented which attempted to minimise the level of systematic error in choosing respondents from one particular group (Goldstein, 2002).

A further challenge is the issue of the openness of interviewees. The focus of elite interviews is analysing their interview responses in context of their position and profession in contrast to their objectivity. The interview is a platform by which they can express their opinion and therefore it needs to be recognised that elite individuals have a purpose in the interview; through talking about their role as an elite individual, they are speaking about their employment and therefore justifying their role (Berry, 2002).

The focus of the interviews was exploring how the interviewees constructed their opinions regarding the interview content. It is possible that the answers given were not their 'true' or 'real' opinions as they may not have been willing to convey their true opinion on certain questions due to their position. For example, interviewees employed in roles such as the police or politicians were likely to be less willing to convey their own opinion because they are expected to reflect the official position of their organisation. Duke (2002) and Lancaster (2017) both mentioned their experiences of interviewing individuals who communicated the 'official line' as their opinion.

Although this was encountered in this research in regard to a small number of interviewees, the majority of individuals spoke with an honesty, especially about the PS Act, which was surprising. In this research, the contrast in which the two individuals in the police answered the questions on the Act was noteworthy. It may have been the case that individuals in higher positions would be less likely to be more honest and open; instead giving answers according to the official line of the profession. Contrastingly, individuals in the police whose job it was to implement the Act may have a different perspective on the Act and its effectiveness. Additionally, it could be suggested that the academics who were interviewed were likely to be more open as part of their profession is to critique.

Conclusion

Analysis of the qualitative interviews would suggest that the DOI is appropriate in explaining the diffusion of NPS. However, themes also emerged which were not applicable to Rogers' theory. For example, the importance of drug use trends was mentioned, yet this aspect does not fit into an appropriate component of the innovation itself. Furthermore, in relation to the innovation itself, whilst numerous factors could be defined as a relative advantage, factors raised by interviewees which related to other components of this aspect of the theory were more difficult to find. Additionally, identifying users of NPS in terms of appropriate adopter categories was a challenge. Whilst psychonauts could be recognised as innovators, other NPS users as the other adopter categories were more challenging to identify. Furthermore, the introduction of the internet has led to a blurring between the mass media and interpersonal channels and assigning online forums to an appropriate category was difficult. Finally, the interviewees spoke little about opinion leaders or change agents which meant that assessing the appropriateness of the theory in this regard was challenging.

Chapter 7: Study Four – Choice-Based Conjoint Analysis of hypothetical NPS purchases

Study Four was a CBC study of people who used drugs and were aged between 18 and 35. It aimed to assess hypothetical drug purchase preferences in accordance with the findings of previous studies. The chapter begins by exploring the results of the questionnaire, before the results of the CBC and finally the LCA findings.

There was a total of 194 respondents. However, 4 participants were removed as they did not report prior use of an illegal drug. Therefore, the total number of analysed participants was 190 (35.8% females and 63.7% males). The mean age of respondents was 25.2 years (Standard Deviation (SD) was 5.26) and in terms of ethnicity, 88.9% of respondents self-identified as white. In relation to employment, 48.4% of respondents were students and 27.4% were in full-time employment. The demographic profile of participants was consistent with other studies of substance use (Vandrey et al, 2012; Vandrey et al, 2012; Werse and Morgenstern, 2012; Kelly et al, 2013; Johnson and Johnson, 2014; Kolliakou et al, 2016; Soussan and Kjellgren, 2016; Barnard et al, 2017).

Questionnaire

Drug-related behaviours

Respondents were asked about their most recent period of drug use (lifetime use only, last year use [which would include lifetime use], last month use [which would include the previous two response categories]), for different drugs (Table 1). The most common use of a drug was alcohol which had been consumed by 98.9% of respondents at least once in their lifetime and 84.2% had used it in the last month. In terms of controlled drugs, 95.8% of respondents had ever used cannabis, with 48.4% in the last month. The next most popular drug in this study was ecstasy where lifetime use was 68.4%, of which 23.2% was use in the last month. Lifetime cocaine use was at 61.1% with 23.2% of use in the last month.

In terms of NPS, the most common NPS was nitrous oxide which had ever been used by 45.3% of the respondents with 10.5% using in the last month. 20.5% of respondents had ever used SCRA but only 1.6% in the last month. For the respondents who had used NPS, 18.9% had used NPS in the form of a powder, crystal or tablet with 16.3% in the form of a herbal smoking mixture.

Table 1: Drug History

	Use in lifetime only	Use in last year	Use in last month	Never	% reporting lifetime use
Alcohol	7.9%	6.8%	84.2%	1.1%	98.9%
Amphetamines	20.5%	11.6%	12.1%	55.8%	44.2%
Cannabis	19.5%	27.9%	48.4%	4.2%	95.8%
Cocaine	17.9%	20.0%	23.2%	38.9%	61.1%
Ecstasy/MDMA	25.3%	25.8%	17.4%	31.6%	68.4%
GHB/GBL	7.9%	0.5%	2.1%	89.5%	10.5%
Ketamine	22.6%	11.1%	10.0%	56.3%	43.7%
LSD	20.5%	16.3%	5.3%	57.9%	42.1%
Magic Mushrooms	24.7%	19.5%	12.6%	43.2%	56.8%
Mephedrone	12.6%	1.1%	1.6%	84.7%	15.3%
Nitrous Oxide	24.2%	10.5%	10.5%	54.7%	45.3%
Revelin	1.1%	0%	0%	98.9%	1.1%
SCRA	15.3%	3.7%	1.6%	79.5%	20.5%
Synthetic Cathinones	5.3%	1.6%	1.1%	92.1%	7.9%
Tobacco	26.3%	14.2%	49.5%	10.0%	90.0%
Other NPS	9.5%	7.4%	5.8%	77.4%	22.6%
Other	20.0%	6.3%	12.1%	61.6%	38.4%

The differences between female and male last year use of NPS can be seen in Table 2. There were higher proportions of NPS use by men in the sample compared to women. This is especially noticeable for both SCRA and nitrous oxide. Male respondents having greater use of a range of NPS than female respondents is similarly found in other studies (Van Hout and Brennan, 2011; Corazza et al, 2014a; Helander et al, 2014; Goggin et al, 2015; Palamar et al, 2015).

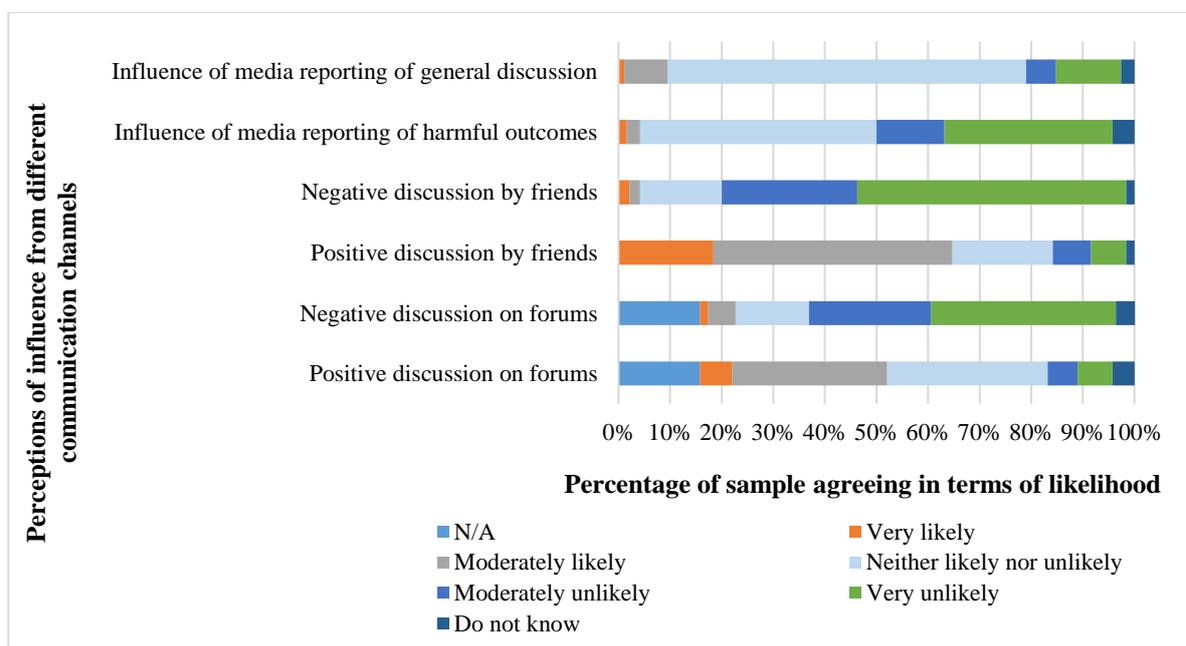
Table 2: NPS use by gender

Last year use	Female (n = 68)	Male (n = 121)
Nitrous Oxide	5.9% (4)	13.2% (16)
Mephedrone	0% (0)	1.7% (2)
SCRA	1.5% (1)	10.7% (13)
Synthetic Cathinones	1.5% (1)	4.1% (5)
Other NPS	0% (0)	2.5% (3)

Respondents were asked to identify from where they purchased their drugs. The highest percentage was from friends or acquaintances (34.7%). However, primary supply for these friends may have been from the other sources listed. Only 5.3% reported purchasing from clearnet websites and darknet cryptomarket purchases were reported by 5.8%.

Respondents were asked whether they used online forums to discuss drug use and 42.1% responded that they did. If the respondents used forums, they were asked how much influence they thought they had on their decision to use a particular product. 5.8% responded that this would have a ‘very strong influence’, 16.8% responded with ‘strong influence’ and 9.5% of respondents stated that the forums would have ‘no influence’ on their decisions. The reasons for forum use were also examined in the questionnaire where respondents were asked to indicate all the reasons for their use. 53.7% answered they used forums to gain information about effects of drugs and 53.2% answered to gain information about the side effects of drugs. The use of forums to gain information about price was endorsed by 7.9% of respondents and to learn about the availability of drugs by 10%. Respondents were asked if there were other aspects of online forums which were important to them. Answers included dosage, the cultivation of drugs, how to use different drugs, and gaining information about the popularity of a product. The influence of online forums in comparison to the media and friendship networks can be seen in Figure 3.

Figure 3: Perceptions of different levels of likelihood of trying a product following influence by the media, friendship networks and online forums



Respondents were also asked how likely they would be to seek out information about the harms and effects of drugs. 53.7% of respondents answered that they would be ‘very likely’ and 22.6% answered ‘moderately likely’. 3.7% of respondents answered that they would be ‘very unlikely’ to seek out information. Respondents were asked about the harm reduction practices they currently utilised. The

most frequent answer was to 'avoid frequent/heavy use of drugs' which 71.6% endorsed. The 'purchase of drugs from a trusted source' was indicated by 67.4% of respondents and 57.9% would 'use drugs with friends' as a harm reduction practice. Respondents were also asked the source they would use to seek out information about the harms and effects of drugs. The most popular source was friends or acquaintances which was chosen by 59.5% of respondents. 56.3% chose independent drug information websites but only 20% chose government branded drug information websites. The use of darknet websites was chosen by only 6.8% and the least popular option was the police with 4.2%.

Choice-Based Conjoint Analysis

Importance of attributes

The importance of each attribute refers to the attribute as a whole and not the individual attribute levels. The software calculates importance by firstly calculating the utility score range of each attribute and dividing this total by the total utility range, multiplied by 100 (Orme, 2010). As the importance is described as a percentage this adds up to 100%. Presentation of data in this way allows assessment of the proportional importance of each attribute.

The most important attribute for the whole sample was ‘side effects’, which had an average contribution of 35.2% to the overall utility. This was followed by ‘desired effects’ (26.3%) and the ‘drug category’ (17.7%). ‘Accessibility’ (6.7%) had the lowest importance among the respondents followed by ‘price’ (14.0%). The importance of an attribute can be compared to other attributes; therefore ‘side effects’ can be interpreted as being five times as important to respondents as ‘accessibility’. Together ‘side effects’ and ‘desired effects’, can be seen to be particularly influential; they had a combined importance of 61.49%. The overall relative importance of the different attributes can be seen in Figure 4 and Table 3.

Figure 4: Importance of different attributes of hypothetical drugs

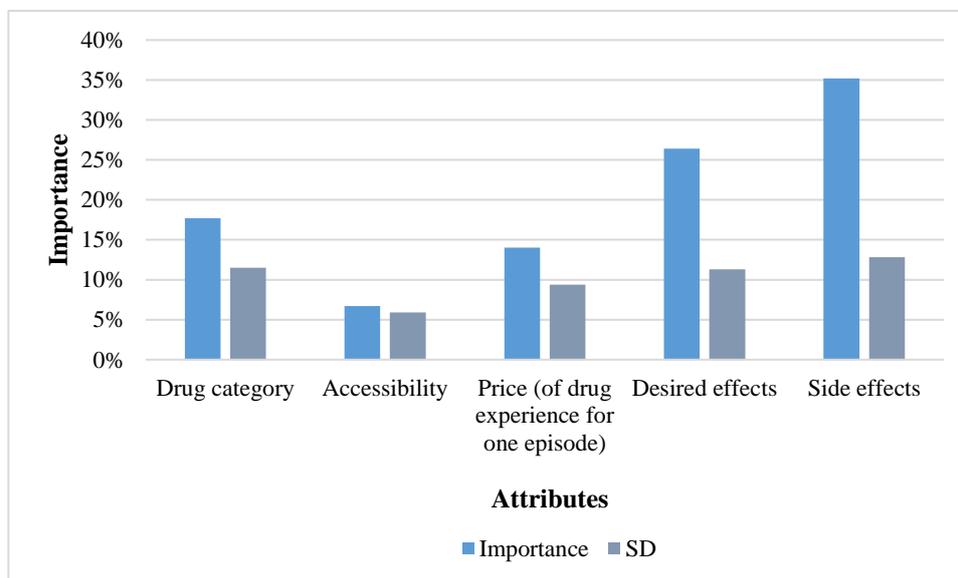


Table 3: Importance of different attributes of hypothetical drugs

Attribute	Importance	SD	Lower 95% CI	Upper 95% CI
Drug category	17.7%	11.5%	16.4%	19.3%
Accessibility	6.7%	5.9%	5.9%	7.5%
Price (of drug experience for one episode)	14.0%	9.4%	12.7%	15.4%
Desired effects	26.4%	11.3%	24.8%	28.0%
Side effects	35.2%	12.8%	33.4%	37.0%

The importance of each attribute was compared across different demographic groups through segmentation. In relation to employment status, see Table 4, both those in full-time employment (35.7%) and students (35.4%), ranked ‘side effects’ as the most important attribute. The ranking of attributes was the same for both groups however there was a relatively large difference for the importance of ‘price’ for the two groups: 11.81% for those in full-time employment and 15.75% for students. The attribute of ‘drug category’ had the highest percentage of importance among the group not in employment or education. However, the ranking of attributes was the same for all groups. In comparison with the other groups based on employment, the attributes of ‘price’ and ‘accessibility’ had the highest importance percentages among students.

Table 4: Importance of different attributes by employment status

Attributes	Full-time Employment (n = 52) Importance % (SD)		Student (n = 92) Importance % (SD)	
Drug Category	17.0%	(9.6%)	16.6%	(11.6%)
Accessibility	6.4%	(5.1%)	7.6%	(6.4%)
Price (of drug experience for one episode)	11.8%	(8.6%)	15.8%	(9.9%)
Desired effects	29.1%	(8.5%)	24.6%	(11.6%)
Side effects	35.7%	(11.5%)	35.4%	(12.5%)

Utilities

A part-worth utility score is a measure of the overall preference associated with each level of each attribute. The utilities value for each attribute total 0 as zero-centering allows comparisons to be made (Jervis et al, 2012). The higher the part-worth utility for each attribute level the greater the preference for that attribute level. For example, for ‘accessibility’, the most preferable attribute level was ‘easy to obtain’ (16.26) and the least preferable attribute level was ‘difficult to obtain’ (-17.27). This does not mean that ‘difficult to obtain’ was unattractive to all respondents; it means that, if everything was equal, the other attribute levels were preferential. The attribute with the largest difference between

the highest and the lowest utilities of each attribute level can also be interpreted as the most important attribute. ‘Side effects’ had the largest range in utility scores (82.2 and -93.88) and this is shown in the high importance score of ‘side effects’. Figure 4 and Tables 5-9 highlight these utility scores between the different attributes.

Figure 5: Preferences for different attribute levels of hypothetical drugs

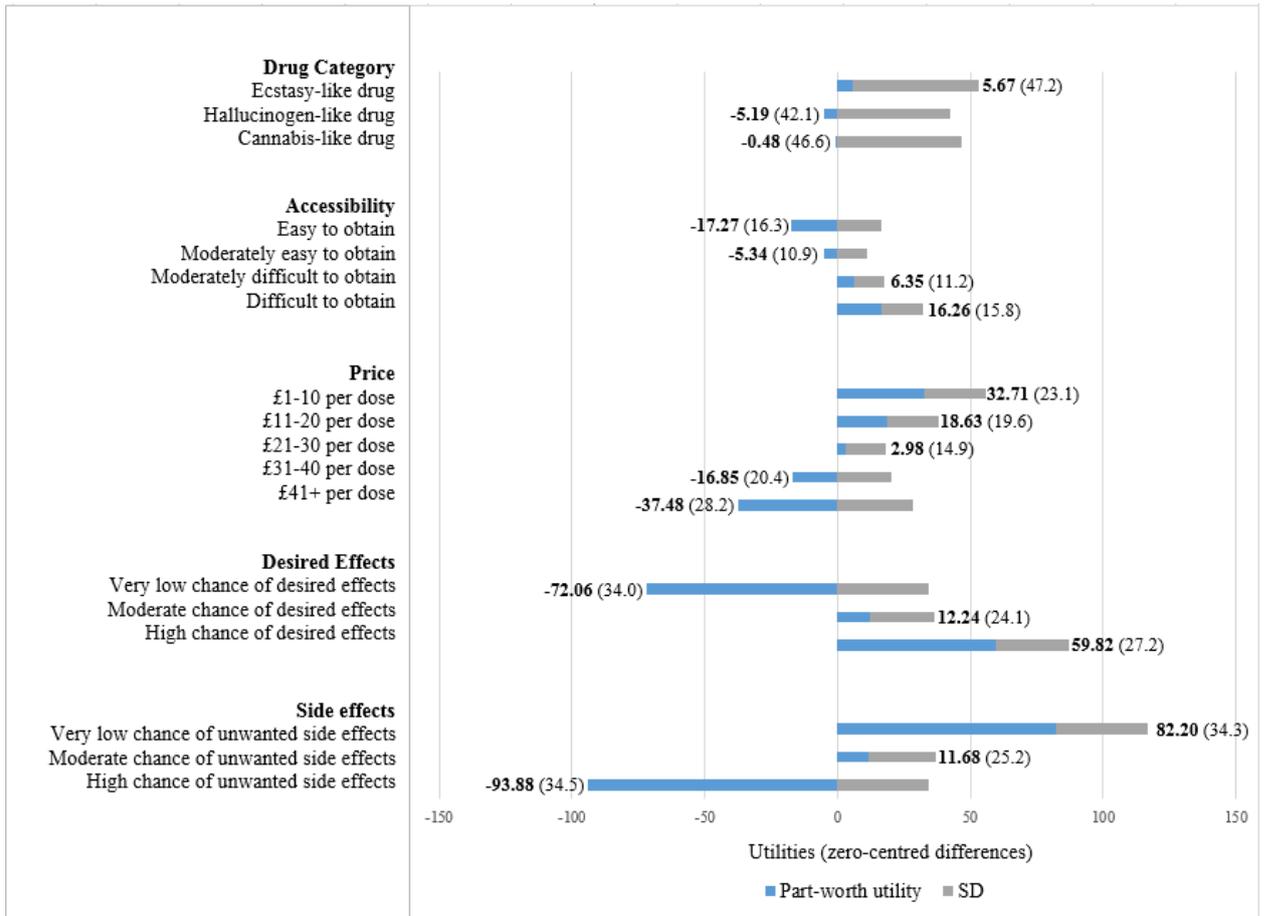


Table 5: Preferences for different **drug category** attribute levels of hypothetical drugs

Attribute Levels	Part-worth utilities	SD
Ecstasy-like drug	5.67	47.2
Hallucinogen-like drug	-5.19	42.1
Cannabis-like drug	-0.48	46.6

Table 6: Preferences for different **accessibility** attribute levels of hypothetical drugs

Attribute Levels	Part-worth utilities	SD
Difficult to obtain	-17.27	16.3
Moderately difficult to obtain	-5.34	10.9
Moderately easy to obtain	6.35	11.2
Easy to obtain	16.26	15.8

Table 7: Preferences for different **price** attribute levels of hypothetical drugs

Attribute Levels	Part-worth utilities	SD
£1-10 per dose	32.71	23.1
£11-20 per dose	18.63	19.6
£21-30 per dose	2.98	14.9
£31-40 per dose	-16.85	20.4
£41+ per dose	-37.48	28.2

Table 8: Preferences for different **desired effects** attribute levels of hypothetical drugs

Attribute Levels	Part-worth utilities	SD
Very low chance of desired effects	-72.06	34.0
Moderate chance of desired effects	12.24	24.1
High chance of desired effects	59.82	27.2

Table 9: Preferences for different **side effects** attribute levels of hypothetical drugs

Attribute Levels	Part-worth utilities	SD
Very low chance of unwanted side effects	82.20	34.3
Moderate chance of unwanted side effects	11.68	25.2
High chance of unwanted side effects	-93.88	34.5

When interpreting part-worth utilities from conjoint analysis, the part-worth utility for one level of an attribute should not be compared to the part-worth utility for another level from another attribute. For example, it cannot be interpreted that ‘moderate chance of desired effects’ (12.24) is preferential to a ‘moderate chance of unwanted side effects’ (11.68). Within an attribute however, part-worth utilities can be compared, but comparing different attribute levels in terms of ratios cannot. For example, it cannot be concluded that ‘£11-20 per dose’ (18.63) is nine times as preferred as ‘£21-30

per dose' (2.98) in terms of 'price'. The focus is on comparing the differences in part-worth utility scores within attributes.

Participants were asked whether they discussed drug use on online forums. For 'drug category', for those who did discuss drug use, the highest part-worth utility value was for 'hallucinogen-like drug' (8.10) and the lowest was for 'cannabis-like drug' (-8.12). However, for those who did not discuss drug use, 'ecstasy-like drug' (10.12) had the highest part-worth utility value and 'hallucinogen-like drug' (-15.30) had the lowest. For the other attributes, the difference in part-worth utility values between those who discuss drug use and those who did not was minimal.

Participants were asked about their drug history in the questionnaire. For the individuals who had used cannabis in the last month, a 'cannabis-like drug' had the highest part-worth utility score (3.55). Additionally, for those who had used ecstasy in the last month, an 'ecstasy-like drug' had the highest part-worth utility score (37.98). Furthermore, for those who had used magic mushrooms in the last month, a 'hallucinogen-like drug' had the highest part-worth utility score (20.50). This was similarly the case with LSD use in the last month (21.96). When mephedrone appeared on the recreational market, it was seen as a legal alternative to ecstasy, it was therefore interesting to note that the last month users of mephedrone, had the greater preference for an 'ecstasy-like drug' (63.87). This was similarly the case for last month use of synthetic cathinone use which had the greater preference for an 'ecstasy-like drug' (69.69). For last month users of SCRA, a 'cannabis-like drug' had the highest utility score (19.16).

Results of the Latent Class Analysis

LCA was undertaken to identify subgroups (Classes) of participants based on their profiles of estimated part-worth utilities for each attribute level. In order to determine the optimal class solution for this LCA, the statistical measure of fit, the Bayesian Information Criterion Index (BIC), was used. As shown in Table 10, the four Class solution produced the lowest BIC (4967.91) and therefore this group was chosen as the optimal Class solution. The segment sizes of the four Class solution were 10.6% (21 respondents), 30.0% (57 respondents), 41.3% (78 respondents) and 18.1% (34 respondents).

Table 10: Results of Latent Class Analysis showing Bayesian Information Criterion Index

Groups	Log-likelihood	BIC
2	-2469.98	5150.88
3	-2346.08	5012.443
4	-2269.12	4967.908
5	-2219.06	4977.136
6	-2168.16	4984.715
7	-2133.50	5024.76
8	-2103.69	5074.501
9	-2077.39	5131.284
10	-2057.77	5201.411

In keeping with reporting of LCA, each Class was given a descriptive name to assist interpretation and readability. Class names were based on the relative importance and part-worth utilities of the attributes (Table 11).

Differences in relative importance and part-worth utilities between the Latent Classes

Table 11: Mean relative importance of each attribute within each Latent Class

Attributes	Class 1 'Drug Category focus' <i>n</i> = 21 10.6%	Class 2 'Minimal side effects' <i>n</i> = 57 30.0%	Class 3 'Balanced effects' <i>n</i> = 78 41.3%	Class 4 'Price sensitive' <i>n</i> = 34 18.1%
Drug category	42.4%	10.1%	15.8%	34.8%
Accessibility	8.7%	3.3%	4.4%	6.1%
Price	11.0%	8.7%	10.7%	18.2%
Desired effects	14.2%	20.0%	37.3%	19.6%
Side effects	23.8%	57.9%	31.9%	21.3%

The 'Drug Category focus' Class (Class 1) comprised 21 individuals. For these participants, the 'drug category' was the most important attribute (42.4%) and the lowest three attributes had a difference of only 6 percentage points (14.2%, 11.0% and 8.7%). For the 'Minimal side effects' Class (Class 2), which comprised 57 individuals, the difference between the most important attribute and the other attributes was even greater: 'side effects', which was the most important attribute, was at 57.9% and the remaining three attributes were again close in percentage points (10.1%, 8.7% and 3.3%). The 'Balanced effects' Class (Class 3) comprised 78 individuals and was the largest Class. The

importance of the attributes was more evenly spread among this Class. There was only a difference of 6 percentage points between the most important attribute, ‘desired effects’ (37.3%) and the second most important attribute: ‘side effects’ (31.9%). The remaining three attributes were again close in percentage, although slightly larger than the ‘Drug Category focus’ Class and the ‘Minimal side effects’ Class: 15.8%, 10.7% and 4.4%. For the ‘Price sensitive’ Class (Class 4), which consisted of 34 individuals, the most important attribute was still ‘drug category’ (34.8%) but this Class had the highest ‘price’ preference of the four. The importance attached to the second, third and fourth attributes was close in percentage: 21.3% (‘side effects’), 19.6% (‘desired effects’) and 18.2% (‘price’).

Table 12: Part-worth utilities for each attribute level within each Latent Class

	Class 1 ‘Drug Category focus’ Class n = 21 10.6%		Class 2 ‘Minimal side effects’ Class n = 57 30.0%		Class 3 ‘Balanced effects’ Class n = 78 41.3%		Class 4 ‘Price sensitive’ Class n = 34 18.1%	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Drug Category								
Ecstasy-like drug	2.17	0.18	-0.18	0.08	0.27	0.07	-0.64	0.09
Hallucinogen-like drug	-1.32	0.18	-0.35	0.08	0.60	0.07	-0.23	0.09
Cannabis-like drug	-0.85	0.16	0.53	0.08	-0.87	0.08	0.88	0.08
Accessibility								
Difficult to obtain	-0.11	0.15	-0.04	0.09	-0.18	0.07	-0.04	0.09
Moderately difficult to obtain	0.43	0.14	-0.17	0.09	-0.18	0.08	-0.08	0.09
Moderately easy to obtain	-0.03	0.15	0.13	0.09	0.23	0.07	-0.65	0.10
Easy to obtain	-0.29	0.16	0.08	0.09	0.12	0.08	0.19	0.09
Price (of drug experience for one episode)								
£1-10 per dose	-0.55	0.21	0.40	0.11	0.45	0.09	0.32	0.11
£11-20 per dose	0.23	0.18	0.25	0.11	0.48	0.09	0.08	0.11
£21-30 per dose	0.36	0.18	0.08	0.11	0.03	0.09	0.18	0.11
£31-40 per dose	-0.10	0.18	-0.37	0.11	-0.43	0.09	-0.11	0.11
£41+ per dose	0.05	0.18	-0.35	0.11	-0.52	0.09	-0.48	0.12
Desired effects								
Very low chance of desired effects	-0.72	0.14	-0.94	0.09	-1.97	0.10	-0.50	0.89
Moderate chance of desired effects	0.27	0.13	0.13	0.08	0.46	0.07	0.15	0.83
High chance of desired effects	0.45	0.14	0.81	0.09	1.51	0.08	0.35	0.83
Side effects								
Very low chance of unwanted side effects	0.79	0.15	2.44	0.13	1.27	0.08	0.40	0.08
Moderate chance of unwanted side effects	0.38	0.13	0.22	0.10	0.43	0.07	0.13	0.08
High chance of unwanted side effects	-1.17	0.17	-2.66	0.18	-1.70	0.10	-0.53	0.09

Although the utility of one level of an attribute should not be compared to the utility for another level from another attribute, it is still possible to compare utilities within an attribute and across Classes (Table 12).

For 'drug category', the largest difference between attribute levels was evident in the 'Drug Category focus' Class (2.17 for 'ecstasy-like drug' and -1.32 for 'hallucinogen-like drug'). This difference highlights the strong preference for 'ecstasy-like drug' and very weak preference for 'hallucinogen-like drug' and is confirmed in this attribute assigned as the most important attribute (42.4%) for the 'Drug Category focus' Class. For the other Classes, utility score differences for 'drug category' are less clear. This is perhaps surprising for the 'Price sensitive' Class which also attributed the greatest importance to 'drug category' (34.8%) in the relative importance of the attributes. However, the reason for this may be the more equal distribution of relative importance percentages given to the different attributes in this Class.

For 'accessibility', this attribute had the lowest levels of importance for all Classes in overall attribute importance. In contrast to the total sample which had a clear ascendance of importance in attribute levels: 'difficult to obtain' had the lowest utility score and 'easy to obtain' had the highest, this was not the same for the different Classes. For example, for the 'Drug Category focus' Class, 'easy to obtain' had the lowest utility score (-0.29) and 'moderately difficult to obtain' had the highest utility score (0.43) showing an overall preference for this attribute level in this Class. This is an interesting observation as the 'Drug Category focus' Class assigned the greatest overall importance to this attribute in comparison to the other Classes. For the 'Minimal side effects' Class and the 'Balanced effects' Class, 'moderately easy to obtain' had the greatest overall preference. In contrast, 'moderately easy to obtain' for the 'Price sensitive' Class had the lowest utility score (-0.65) in comparison to the other attribute levels for this attribute and among all the other Classes for this attribute.

'Price', in terms of overall attribute relative importance was the second least important attribute for all Classes. In a similar manner to 'accessibility' whilst there was a clear ranking of importance in utility scores for the total sample; this was not evident for the Classes. For example, '£41+ per dose' was the least preferential for the 'Balanced effects' Class and the 'Price sensitive' Class (-0.52 and -0.48 respectively), but in contrast, for the 'Drug Category focus' Class '£1-10 per dose' was the least preferential (-0.55). This attribute level was assigned the greatest preference for the 'Minimal side effects' Class and the 'Price sensitive' Class (0.40 and 0.32 respectively) but for the 'Balanced effects' Class '£11-20 per dose' had the greatest preference (0.48). The 'Minimal side effects' Class assigned the lowest overall relative importance to 'price' and although the 'Price sensitive' Class assigned the highest overall relative importance to this attribute; other Classes had a greater range in utility scores.

‘Desired effects’ was the most important attribute for the ‘Balanced effects’ Class, however it was the third most important attribute for the ‘Drug Category focus’ Class and the ‘Price sensitive’ Class, and the second most important for the ‘Minimal side effects’ Class. The higher utility scores in this category highlight the stronger preferences among this attribute than for other attributes such as ‘accessibility’ which had lower scores: for example, the lowest utility score for ‘desired effects’ was -1.97 and for ‘accessibility’ it was -0.65. In contrast to the previous three attributes, the ordering of importance for utility scores in each Class matched those found in the total sample: ‘very low chance of desired effects’ had the lowest preference and ‘high chance of desired effects’ had the greatest preference among the Classes. The ‘Balanced effects’ Class assigned ‘desired effects’ as having the greatest overall importance as an attribute (37.28%) and this was evident in the higher utility scores in this Class: ‘very low chance of desired effects’ had a utility score of -1.97 and ‘high chance of desired effects’ had a score of 1.51. The variation between the Classes in relation to ‘moderate chance of desired effects’ was relatively small in comparison with other attributes.

‘Side effects’ was the most important attribute for the total sample and also for the ‘Minimal side effects’ Class where it had the highest percentage for any attribute across all the Classes. This is evident in the utility scores where the range of utility scores for the ‘Minimal side effects’ Class was the highest for any attribute: 2.44 to -2.66. Similarly, to ‘desired effects’ the order of preference of the attribute levels for all the Classes was the same as that of the total sample: ‘very low chance of unwanted side effects’ was the most preferential to ‘high chance of unwanted side effects’ as the least preferential attribute level and this was expected. However, the size of the utility score and therefore the importance assigned to each attribute level varied between Classes. Although the ‘Balanced effects’ Class and the ‘Price sensitive’ Class both assigned ‘side effects’ as the second most important overall attribute; the utility scores varied considerably between the two. This could be a reflection of the total importance assigned between the two groups: 31.9% for the ‘Balanced effects’ Class and 21.3% for the ‘Price sensitive’ Class. For example, for ‘very low chance of unwanted side effects’, this was given a utility score of 1.27 for the ‘Balanced effects’ Class but only 0.40 for the ‘Price sensitive’ Class.

Differences in characteristics of the Latent Classes

Chi-square analyses were conducted for categorical variables, and ANOVA and non-parametric equivalents for continuous variables to examine differences in Class member characteristics.

Table 13: Differences in socio-demographics, drug history, purchasing sources, drug forum use, and drug harm reduction practices between the Latent Classes.

P values in bold are <0.05

	Total Sample n = 190 100%	Class 1 'Drug Category focus' Class n = 21 10.6%	Class 2 'Minimal side effects' Class n = 57 30.0%	Class 3 'Balanced effects' Class n = 78 41.3%	Class 4 'Price sensitive' Class n = 34 18.1%	df	F/ χ^2	p-value
<i>Demographic Characteristics</i>								
Age (years; M and SD)	25.28 5.3	26.81 5.2	25.23 5.4	25.72 5.4	23.44 4.5	3	2.200	0.090
Gender (% male)	63.7% (121)	57.1% (12)	61.4% (35)	67.9% (53)	61.8% (21)	6	3.242	0.778
Ethnicity (% white)	88.9% (169)	95.2% (20)	84.2% (48)	91.0% (71)	88.2% (30)	12	8.029	0.783
Current employment (% full-time employment and student)	27.4% (52) 48.4% (92)	42.9% (9) 33.3% (7)	28.1% (16) 54.4% (31)	30.8% (24) 39.7% (31)	8.8% (3) ^d 67.6% (23) ^d	15	40.903	0.000
<i>Drug history (last year and month use combined) (% and number)</i>								
Alcohol	91% (173)	95.3% (20)	96.5% (55)	87.2% (68)	88.3% (30)	9	6.475	0.692
Cannabis	76.3% (145)	52.4% (11)	75.4% (43)	79.5% (62)	85.3% (29)	9	12.461	0.189
Ecstasy/MDMA	43.2% (82)	76.2% (16) ^a	21.0% (12) ^b	53.8% (42) ^c	35.3% (12)	6	31.631	0.000
LSD	21.6% (41)	4.8% (1)	15.8% (9)	33.3% (26) ^c	14.7% (5)	6	14.098	0.029
Magic Mushrooms	32.1% (61)	9.6% (2)	26.3% (15)	42.3% (33)	32.3% (11)	9	13.481	0.142
Mephedrone	2.6% (5)	14.3% (3) ^a	0.0% (0)	1.3% (1)	2.9% (1) ^d	6	19.716	0.003

SCRA	5.3% (10)	4.8% (1)	3.5% (2)	3.9% (3)	11.8% (4)	9	11.005	0.275
Synthetic Cathinones	2.7% (5)	4.8% (1)	0.0% (0)	1.3% (1)	8.8% (3)	9	15.741	0.072
Other NPS	13.2% (25)	19.0% (4)	5.3% (3) ^b	19.2% (15)	8.8% (3) ^d	6	18.764	0.005
<i>Which NPS form (if NPS use) (% and number)¹</i>								
Herbal smoking mixture	16.3% (31)	4.8% (1)	12.3% (7)	21.8% (17)	17.6% (6)	3	4.492	0.167
Powder/crystal/tablet	18.9% (36)	23.8% (5)	7.0% (4) ^b	26.9% (21) ^c	17.6% (6)	3	8.874	0.031
Liquid	4.2% (8)	4.8% (1)	1.8% (1)	5.1% (4)	5.9% (2)	3	1.463	0.691
Other form	3.7% (7)	0.0% (0)	3.5% (2)	6.4% (5)	0.0% (0)	3	5.481	0.140
<i>Purchasing sources for drugs (% and number)²</i>						15	20.008	0.172
Darknet websites	5.8% (11)	0.0% (0)	3.5% (2)	10.3% (8)	2.9% (1)			
Cleartnet websites	5.3% (10)	4.8% (1)	10.5% (6)	2.6% (2)	2.9% (1)			
Friends/Acquaintances	34.7% (66)	33.3% (7)	35.1% (20)	37.2% (29)	29.4% (10)			
A known dealer	28.9% (55)	28.6% (6)	21.1% (12)	28.2% (22)	44.1% (15)			
A dealer not known personally	13.7% (26)	28.6% (6)	12.3% (7)	11.5% (9)	11.8% (4)			
Other	11.6% (22)	4.8% (1)	17.5% (10)	10.3% (8)	8.8% (3)			
Ease of accessing cannabis (5 point Likert-scale)						3	5.262	0.154
Likelihood of seeking information (5 point Likert-scale)		^g		^e		3	8.970	0.030
Discuss drug use on drug forums (%)	42.1% (80)	28.6% (6)	33.3% (19)	52.6% (41)	41.2% (14)	6	9.151	0.165
Influence of drug forums (4 point Likert-scale) (M + SD)	3.85 1.088	3.95 1.284	4.05 1.093	3.59 0.959	4.06 1.153	3	2.867	0.041
<i>Aspects of drug forums (% and number)</i>								
Effects	53.7% (102)	33.3% (7)	45.6% (26)	69.2% (54) ^c	44.1% (15)	3	13.824	0.003
Side effects	53.2% (101)	47.6% (10)	45.6% (26)	65.4% (51) ^c	41.2% (14)	3	8.204	0.042
Price	7.9% (15)	4.8% (1)	8.8% (5)	3.8% (3)	17.6% (6)	3	5.908	0.116
Availability	10.0% (19)	4.8% (1)	7.0% (4)	11.5% (9)	14.7% (5)	3	2.340	0.505
Other	5.3% (10)	4.8% (1)	1.8% (1)	6.4% (5)	8.8% (3)	3	2.805	0.423
Influence of positive discussion on forums (5 point Likert-scale)			^g	^f		3	9.837	0.020

Influence of negative discussion on forums (5 point Likert-scale)						3	7.497	0.058
Influence of positive discussion among friends (5 point Likert-scale)		f	e, g	f		3	19.544	0.000
Influence of negative discussion among friends (5 point Likert-scale)						3	3.451	0.327
<i>Drug harm reduction practices (% and number)¹</i>								
Purchase from trusted source	67.4% (128)	61.9% (13)	66.7% (38)	70.5% (55)	64.7% (22)	3	0.758	0.859
Use drugs with friends	57.9% (110)	71.4% (15)	56.1% (32)	59.0% (46)	50.0% (17)	3	2.557	0.465
Avoid frequent/heavy use of drugs	71.6% (136)	66.7% (14)	66.7% (38)	73.1% (57)	79.4% (27)	3	2.037	0.565
Get in positive mood before drug use	51.6% (98)	47.6% (10)	40.4% (23)	67.9% (53) ^c	35.3% (12) ^d	3	14.988	0.002
Use test kit for purity	13.2% (25)	9.5% (2)	10.5% (6)	16.7% (13)	11.8% (4)	3	0.688	0.688
Other	18.4% (35)	4.8% (1)	19.3% (11)	24.4% (19)	11.8% (4)	3	5.469	0.141
None of the above	5.3% (10)	4.8% (1)	7.0% (4)	2.6% (2)	8.8% (3)	3	2.450	0.484
<i>Sources of drug information (% and number)¹</i>								
Darknet retailers	6.8% (13)	4.8% (1)	3.5% (2)	9.0% (7)	8.8% (3)	3	2.057	0.561
Cleartnet retailers	10.0% (19)	9.5% (2)	8.8% (5)	9.0% (7)	14.7% (5)	3	0.940	0.816
Medical experts	31.6% (60)	19.0% (4)	29.8% (17)	39.7% (31)	23.5% (8)	3	5.034	0.169
Friends/Acquaintances	59.5% (113)	66.7% (14)	57.9% (33)	61.5% (48)	52.9% (18)	3	1.250	0.741
Online forums	52.1% (99)	38.1% (8)	40.4% (23) ^b	65.4% (51) ^c	50.0% (17)	3	10.379	0.016
Other online resources	48.4% (92)	28.6% (6)	43.9% (25)	56.4% (44)	50.0% (17)	3	5.815	0.121
Police	4.2% (8)	0.0% (0)	0.0% (0)	6.4% (5)	8.8% (3)	3	8.901	0.031
Independent drug info websites	56.3% (107)	33.3% (7) ^a	54.4% (31)	67.9% (53) ^c	47.1% (16)	3	10.070	0.018
Government led drug info websites	20.0% (38)	19.0% (4)	17.5% (10)	20.5% (16)	23.5% (8)	3	0.504	0.918
Other	6.3% (12)	9.5% (2)	5.3% (3)	9.0% (7)	0.0% (0)	3	5.699	0.127
None of above	7.4% (14)	9.5% (2)	7.0% (4)	5.1% (4)	11.8% (4)	3	1.605	0.658
Influence of media reporting harmful outcomes (5 point Likert-scale) (M + SD)	3.76 1.012	3.85 1.226	4.02 1.070 ^g	3.49 0.844 ^f	3.87 1.024	3	3.241	0.023
Influence of media reporting general discussion (5 point Likert-scale)			g	f, h	g	3	19.354	0.000

^a Class 1 is significantly different

^b Class 2 is significantly different

^c Class 3 is significantly different

^d Class 4 is significantly different

^e Significant difference with Class 1

^f Significant difference with Class 2

^g Significant difference with Class 3

^h Significant difference with Class 4

¹ Multiple responses allowed

² Single response only allowed

Descriptive characteristics and significant differences in demographics, drug history, purchasing sources, drug forums, drug harm reduction practices between the four Classes are shown in Table 13.

Demographics

No significant differences were found between the four Classes for age, gender or ethnicity. However, a significant difference was found for current employment for the 'Price sensitive' Class, both in full-time employment and the student population (see Table 13). This Class had a smaller proportion of those in full-time employment (8.8%) but a higher proportion of students (67.6%). In contrast, the 'Drug Category focus' Class had 42.9% in full-time employment and 33.3% were students.

Drug history

The positioning for the Classes, except for the 'Minimal side effects' Class which had lower use percentages for the majority of drug categories, in relation to drug history was spread evenly among the categories. However, significant differences between the Classes were found for some drugs. It should be noted that some of the sizes of populations for the different classes were very small. There were variations in the size of users within each Class without being statistically significant. For example, use of cannabis varied within the Classes from 52.4% in the 'Drug Category focus' Class to 85.3% in the 'Price sensitive' Class. A disparity was also seen between the 'Drug Category focus' Class and the 'Balanced effects' Class in relation to Magic Mushrooms: the 'Drug Category focus' Class (9.6%) and the 'Balanced effects' Class (42.3%).

Nevertheless, for the use of ecstasy within the last year and month there were statistical differences for the 'Drug Category focus' Class, the 'Minimal side effects' Class and the 'Balanced effects' Class (see Table 13). There were also statistically significant differences between the Classes for both LSD and mephedrone. For the 'Minimal side effects' Class and the 'Price sensitive' Class the numbers were statistically different in terms of being low.

In relation to powder/crystal/tablet form of NPS there were significant differences found for the 'Minimal side effects' Class and the 'Balanced effects' Class. The only other notable difference between the Classes related to the form of herbal smoking mixture where only 4.8% of the 'Drug Category focus' Class had used this form of NPS in contrast to 21.8% of the 'Balanced effects' Class.

Drug purchasing

There were relatively large differences between the Classes in the use of a known dealer where percentages ranged from 21.1% in the 'Minimal side effects' Class to 44.1% in the 'Price sensitive' Class. Additionally, a relatively high percentage of the 'Drug Category focus' Class used a dealer not known personally (28.6%) in comparison to the other Classes (12.3%, 11.5% and 11.8% respectively).

Forums

In relation to the forums, over half of those in the 'Balanced effects' Class (52.6%) discussed drug use in comparison to only 28.6% in the 'Drug Category focus' Class. Participants were asked what aspects of forums they paid most attention to and there were statistically significant differences found in the 'Balanced effects' Class for both effects and side effects. Participants were asked about the influence of trying a product if it had positive or negative discussions on the forums. In relation to positive discussions, there were statistically significant differences between the 'Minimal side effects' Class and the 'Balanced effects' Class.

Friendship networks

Participants were also asked about the influence of trying a product if it had positive or negative discussions in their friendship networks. In relation to positive discussions, there were statistically significant differences found between the 'Minimal side effects' Class and the 'Drug Category focus' Class and between the 'Minimal side effects' Class and the 'Balanced effects' Class.

Harm reduction

For sources of drug information, there were statistically significant differences for the 'Minimal side effects' Class and the 'Balanced effects' Class in terms of online forums and the 'Drug Category focus' Class and the 'Balanced effects' Class in the use of independent drug information websites. The use of online forums as sources of drug information were statistically different from the 'Minimal side effects' Class and the 'Balanced effects' Class. The 'Balanced effects' Class had a proportionally higher use of online forums as a harm reduction practice (65.4%). This was also emphasised in the question regarding forum use where the 'Balanced effects' Class had the highest proportion of use. Additionally, the use of independent drug information websites was proportionally lower for the 'Drug Category focus' Class (33.3%) and proportionally higher for the 'Balanced effects' Class

(67.9%). Overall, among all the sources, the only example where use was above 50% for all Classes was the use of friends/acquaintances as a source of drug information. The use of the police, other sources and darknet retailers was below 10% for all Classes.

For drug harm reduction practices, the only statistically significant difference between Classes was getting in a positive mood before drug use where the 'Balanced effects' Class had proportionally higher numbers (67.9%) and the 'Price sensitive' Class had proportionally lower numbers (35.3%). Overall, for drug harm reduction practices, the percentages of each Class engaging in purchasing from a trusted source, using drugs with friends and avoiding frequent/heavy use of drugs was 50% or higher. Using a test kit for purity, other drug harm reduction practices and not engaging in any of the drug harm reduction practices mentioned was below 25% for each Class.

Media

Results from the first ANOVA test showed that there were significant differences between the 'Minimal side effects' Class and the 'Balanced effects' Class when participants were asked to rank on a Likert-point scale the influence the media would have on them reporting harmful outcomes. The 'Balanced effects' Class was more likely to be less influenced by media reporting in comparison to the 'Minimal side effects' Class. In terms of the influence of the media in general discussion of a product, participants were again asked to rank the level of influence on a Likert-point scale. There were statistically significant differences found between the 'Balanced effects' Class and the 'Minimal side effects' Class and between the 'Balanced effects' Class and the 'Price sensitive' Class.

Having examined the differences between the Classes in relation to the questionnaire, it is now important to analyse the Classes as a whole.

Summary of findings

The 'Drug Category focus' Class (Class 1)

This Class can be seen to represent the Class who were the most digitally inexperienced among the four Classes. The Class comprised 21 individuals, which was the smallest of the Classes and included the lowest percentage of men. The Class had the oldest members, and this was also demonstrated by the lowest percentage of students and highest number of people in full-time employment across the four Classes.

For drug history, this Class had the highest percentage of MDMA use and this was also the only Class where MDMA use was higher than alcohol. The popularity of MDMA was reflected in the

CBC where an 'ecstasy-like' drug was the most popular drug category. Additionally, this Class had the lowest percentage across the Classes for cannabis, LSD and magic mushroom use and this was reflected in the disparity between the utility scores for drug category.

Digital inexperience is suggested by the Class having the lowest percentage across all Classes in sourcing drugs through the darknet or 'other' sources. Conversely, the Class had the highest percentage across the four Classes for sourcing drugs through a dealer not known personally. Furthermore, this Class had the lowest percentage across the Classes for discussing drug use on online forums, and in particular discussing effects and availability of drugs on forums.

This Class had the lowest percentage of engagement in harm reduction practices. These practices were purchasing from a trusted source, avoiding frequent or heavy use of drugs, using a test kit or other practices. The highest engagement of a practice was for using drug with friends, which was also the highest percentage across all the four Classes. This social aspect of drug use for this Class was also confirmed through the Class having the highest percentage for using friends and acquaintances as a source of drug information which was the highest across the Classes. However, the Class had the lowest percentage of use for sourcing drug information from medical experts, online forums, other online resources, the police and independent drug information websites.

In terms of utility scores, the Class exhibited unusual preferences. For example, for 'price', '£1-10' was the least preferred whereas '£21-30' was the most preferred. This may relate to the perception that higher prices equate to higher quality, which was a viewpoint of a retailer in Study Two, however this is unknown. Drugs which were 'moderately difficult to obtain' were the most preferential and 'easy to obtain' the least.

The 'Minimal side effects' Class (Class 2)

This Class contained 57 participants but had less distinctive characteristics than the other Classes and had the least interest in NPS. This can be seen in the Class having the lowest percentage of use for SCRA, synthetic cathinones (both of which were at 0%), mephedrone and other NPS. Furthermore, the Class had the lowest percentage for use of NPS in the form of powder/crystal/tablet and liquid. The use of alcohol was the highest for this Class (96.5%). Additionally, with the exception of alcohol and LSD, the 'Minimal side effects' Class had the lowest or second lowest percentage of use within each category of drug history across the Classes.

For drug purchasing sources, the Class had the highest percentage across the Classes for the use of clearnet websites although the highest percentage within this Class was through friends or acquaintances. The Class did not appear to have much involvement with online forums or the internet for their drug use. For sourcing information about drugs, the Class had the lowest percentage across

the Classes for the use of darknet or clearnet retailers. The leading source of drug information in this Class was from friends and acquaintances. This Class was the most likely to be influenced by the media reporting harmful outcomes about a drug.

‘Side effects’ were the overall most important attribute for this Class and this was the highest percentage (57.9%) for any attribute across all the Classes. The importance of this attribute for this Class is highlighted through the high utility scores (2.44, 0.22 and -2.66). ‘Accessibility’ was the least important attribute for this Class and additionally ‘drug category’ and ‘price’ all represented the lowest percentages for each attribute across the four Classes.

The ‘Balanced effects’ Class (Class 3)

This Class comprised the largest number of respondents with 78. The Class can be characterised by its interest in harm reduction and online forums. Across the four Classes, the ‘Balanced effects’ Class had the highest percentage of participants involved in harm reduction practices: purchase from a trusted source, get in positive mood before drug use, use test kit for purity and ‘other’ forms of harm reduction. The Class also had the lowest percentage for ‘none of the above’.

In terms of online forums across the Classes, this Class had the highest percentage of forum use and was most strongly influenced by the forums. In terms of aspects of the forums, effects was the most important aspect in this Class and it had the highest percentage among all the Classes in addition to side effects. This is emphasised in the relative importance of ‘desired effects’ being the most important attribute for this Class. In relation to the internet, this Class had the highest percentage across the Classes for sourcing information from darknet retailers, online forums, independent drug information websites and medical experts. This Class had the lowest percentage across the Classes for using none of the drug information sources.

This Class had the highest percentage across the Classes for the use of darknet websites as a source for purchasing drugs, in addition to sourcing drugs from friends and acquaintances which was also the highest percentage in this Class. Sourcing drugs from friends and acquaintances was the most popular source for purchasing drugs across all the Classes. For overall relative importance of each attribute, ‘accessibility’ was the least important attribute. For this Class, a ‘hallucinogen-like drug’ was the most preferential and this was highlighted in this Class having the highest percentage for LSD and magic mushroom use. In relation to NPS, this Class had the highest percentage of use across the Classes in other NPS use and the highest percentage of use across the Classes for the use of different forms of NPS including herbal smoking mixture, powder/crystal/tablet and other forms.

The Class as a whole appeared knowledgeable and wished to obtain information about the drugs they were using through online forums and other information sources. This Class also had the highest proportion of all the Classes engaging in harm reduction practices.

The 'Price sensitive' Class (Class 4)

This Class comprised 34 individuals. The Class was the youngest Class and this was reflected in the highest percentage of students across the Classes and the highest percentage for cannabis use across all the classes. In utilities scores this was confirmed through the overall preference for a 'cannabis-like drug'. This Class also had the highest percentage of use across the Classes for both SCRA and synthetic cathinones. Conversely, among the different drugs in this Class, mephedrone had the lowest percentage of use. Alcohol had the highest percentage of use for this Class in comparison to the other drugs.

This Class could be characterised by representing a relatively more traditional group of users in comparison to the 'Balanced effects' Class but less traditional than the 'Drug Category focus' Class. This is shown through the Class being the least influenced by online forums and the sources this Class would use to seek information about drugs were the highest percentage across the Classes for clearnet retailers, the police and government led drug information websites. The use of these drug information sources represented a group of users who wish to engage in more traditional forms of seeking information. The most popular source of drug information for this Class was through friends and acquaintances; the percentage for this Class however, was the lowest across the four Classes.

Although this Class was influenced the least by online forums, percentages of use for price, availability and other aspects of the online forums were the highest across the four Classes for the 'Price sensitive' Class. The lack of importance of 'side effects' for this Class can be seen through the importance percentage for this attribute as being the lowest across the four Classes, although within the Class, 'accessibility' was the least important attribute.

This Class engaged in more traditional forms of drug purchasing. The lowest use of sources in this Class were for darknet and clearnet websites whereas the highest percentage of use was for the use of a known dealer. In addition, the Class portrayed a relative lack of interest in engaging in harm reduction practices. The Class had the highest percentage across the four Classes for engaging in none of the harm reduction practices listed, although this practice had the lowest percentage for this Class. Additionally, the Class had the highest percentage across the four Classes for avoiding frequent/heavy use of drugs; this was also the highest percentage for this Class.

The 'Price sensitive' Class gave the greatest importance to 'drug category' and the importance of drug category can be emphasised in the utility scores for this attribute in which a 'cannabis-like drug'

had a utility score of 0.88 in contrast to a 'hallucinogen-like drug' which had a score of -0.23 and 'ecstasy-like drug' with -0.64. It is perhaps surprising that an 'ecstasy-like drug' had a lower utility score than a 'hallucinogen-like drug' because of the demographics of this Class. In the other utility scores, this Class gave the greatest preference to the attribute levels which would be the obvious choices, but which were not chosen throughout the Classes. For example, 'easy to obtain' was the most preferred 'accessibility' level and '£1-10 per dose' was the most preferred 'price' level.

Study Strengths and Limitations

Questionnaire

Online questionnaires are described as the ‘perfect tool’ to conduct research focused on convenience or specific samples (EMCDDA, 2014: 10) including access to hard-to-reach or hidden groups such as recreational drug users (Andrews et al, 2003; Miller et al, 2007; EMCDDA, 2014). The internet is described as offering a ‘unique point of access’ to current drug users (Miller and Sønderslund, 2010: 1558). The use of online questionnaires is especially appropriate for conducting research with younger drug users because of the large number of young people using the internet (Miller and Sønderslund, 2010). Additionally, the internet is a suitable medium in which to conduct research on illicit drug use because of the relative anonymity offered. A common form of recruitment when conducting online questionnaires is through advertisements on websites which are known to be accessed by the target population. Consequently, the target population will have a ‘definite interest’ in the issue of the questionnaire (Miller and Sønderslund, 2010: 1562).

Key advantages of conducting online questionnaires include reduced costs, convenience, the speed of distribution and the speed of responses and data entry (Andrews et al, 2003; Miller et al, 2007; Miller and Sønderslund, 2010). Additionally, to address the validity of the study, a fake drug was included to assess misreporting (‘Revelin’). This practice was also used in the study by Sande (2015) to verify the validity of their questionnaire.

Although online questionnaires offer advantages, there are also limitations, and this includes the composition of the sample. This sample was not ethnically diverse; 88.9% of respondents were white. Additionally, almost half of the sample were students. This was likely to have been influenced by the sources in which the study was advertised: university mailing lists. Therefore, there is potential for sampling and response bias which resulted from the recruitment strategy. The study was advertised online through advertisements on online forums, mailing lists and the social media platforms Facebook and Twitter. For individuals to complete an online questionnaire on drug use, they must have internet access and an element of privacy (Miller et al, 2007). The individuals most likely to complete online questionnaires are male and well-educated (Miller and Sønderslund, 2010) which also leads to selection bias. This was found in this questionnaire: 63.7% of respondents were male and 35.8% female.

The questionnaire was advertised only through social media and specific online forums which may have limited the sample. Individuals recruited through online forums may not represent the population of NPS users in general, including hidden populations. The individuals excluded from the sample, and therefore resulting in non-response bias, include individuals who were not made aware

of the questionnaire, individuals who chose not to complete the survey and individuals without internet access or an interest in discussing drugs in online forums (Fletcher et al, 2016). The limitations of studies with self-selected samples is recognised in a number of NPS studies (Gonzalez et al, 2013; Winstock and Barratt, 2013; Corazza et al, 2014a; O'Brien et al, 2014; Goggin et al, 2015; Keyes et al, 2016; Soussan and Kjellgren, 2016; Sutherland et al, 2017). Self-selected samples have limitations in terms of recall bias; this may be underreporting NPS use or a lack of knowledge of which drugs have been used. Johnson and Golub (2007) stated that the literature suggests that participants frequently underreport recent illegal drug use. However, Palamar et al (2017) suggested that anonymous online questionnaires are likely to result in individuals feeling more comfortable in revealing sensitive information.

A further limitation was the small sample and this is recognised in other studies (Gonzalez et al, 2013). Small sample sizes have limitations in generalising the findings to other populations. Nevertheless, Hondebrink et al explained that small and self-selecting samples still provide 'a useful insight in actual NPS use' (2015: 110). Additionally, a limitation of the study can relate to the sample comprising individuals only from the UK and therefore the findings cannot be generalised to other countries.

A further consideration is that due to the anonymity of the internet there was no means in which to identify resubmission of questionnaires. Moreover, the anonymity of the internet meant that there was no method in which to confirm respondents were eligible for the study in that they may have been a non-drug user. This bias was partly mitigated by primarily advertising the study on drug discussion forums and highlighting the questionnaire was for recreational drug users only. A final limitation of the questionnaire which is recognised in the literature (Matthews et al, 2017) is the subjective nature of rating scales.

CBC

CBC is commonly used in market research as the task of selecting a preferred concept is practical, straightforward to comprehend and a relatable concept (Natter and Feurstein, 2002; Kievit et al, 2010). CBC allows participants to compare products and view alternative products as they would in a real-life scenario when purchasing a product. CBC is useful in that it can help uncover realistic trade-offs that consumers would have to make when making purchasing decisions and therefore revealing preferences (Louviere, 1988). Van Heek et al (2017) suggested that the ability of CBC and CA as a whole to breakdown the preferences made by participants to measure their utility score and assess which attribute and attribute level is valued the highest is a strength of this method. Additionally, CBC can measure interactions between different attributes, which allows for

examination into whether an attribute on its own has an effect on choices made or whether there is an effect when two attributes are presented together (Orme, 2010).

Limitations associated with CBC mainly relate to the selection of attributes. For example, each choice that is presented to respondents requires the processing of a lot of information in order to make a decision. In this study, each respondent was presented with four concepts with five attributes. Green and Srinivasan (1990) stated that six is the maximum number of attributes for profile concepts in CA, yet this has been widely debated (Sawtooth Software, 2013). Other researchers suggested that respondents can evaluate more than six attributes as they begin to only focus on the attributes which are important and therefore simplify the CBC task (Sawtooth Software, 2013). This is not a limitation however, as this may mimic real life purchasing decisions (Scherer et al, 2017).

CBC has other limitations because of the restrictions placed on the participants in there being only five attributes, which were chosen by the researcher. For some participants, attributes not included in the CBC may be more important in their decision to choose a particular drug. Furthermore, a different set of attributes may have affected the importance of different attributes (Smith et al, 2016). For example, had an attribute been included which was deemed more important than 'side effects' this would have affected the pattern of attribute importance. However, the CBC was measuring the importance of these attributes and the addition of more attributes would have created a CBC which would have required a large amount of information processing for each task.

A further limitation of the study is the lack of knowledge as to what level of importance the respondents who did not complete the questionnaire and study would have placed on the different attributes. A limitation of this study, which was also recognised by Soussan et al (2018), was that substance-specific motivations could not be investigated. For example, a lack of unwanted side effects may be important in relation to one specific NPS but may be less important in relation to another. A further limitation of this CBC could be seen in the attributes 'side effects' and 'desired effects' and the subjective assessment of what constituted 'very low chance' or 'high chance'.

The decision to not include a 'none of these' option could be seen as a limitation as participants were forced to choose a product although the options may not be equivalent to the real life attributes of the drugs they purchase. Similarly, the use of CBC could be seen as a limitation in that it involves the hypothetical choosing of products and may not reflect real life behaviour affecting the setting of drug use, this was recognised by Scherer et al (2017) in their study. This study was exploratory and therefore the findings should not be generalised to other samples. However, the size and bias of the sample should be recognised as a limitation and this was also recognised in the studies by Smith et al (2016) and Zaunbrecher et al (2017). Zaunbrecher et al (2017) concluded from their research that

including a larger and more diverse sample would be beneficial in gaining a better generalisation of results.

Conclusion

Having explored the diffusion of NPS in the literature and through interviews with retailers and professionals, it was important to determine some of the reasons why certain NPS diffuse and others do not from the perspective of current drug users. The CBC focused on Rogers' relative advantage aspect of the DOI, and the accompanying questionnaire allowed for the exploration of the communication channels component. The other two components of Rogers' theory, time and the social system were explored through the LCA.

In the CBC, it was interesting that the population sample viewed 'side effects' as the most important attribute influencing their decision to choose a hypothetical NPS as this aspect of drug use had limited discussion in the other studies of this thesis. However, similarly to the other studies, the aspect of 'desired effects' was an important influence on drug use. The LCA highlighted the diversity of drug users more generally in that the different Classes ranked different attributes with varying levels of importance, which emphasises contrasting motivations for drug use. In relation to communication channels, the influence of friendship networks was the biggest influence on NPS use and choice of NPS. Rogers' theory appears to be appropriate in relation to the diffusion of NPS through exploring motivations for drug use among drug users.

Chapter 8: Discussion

This discussion was undertaken by implementing the weaving approach which involved writing both the quantitative findings (Study Four) and the qualitative findings (Studies One, Two and Three) simultaneously on a theme-by-theme basis (Fetters et al, 2013), and structured in accordance to the key features of Rogers' DOI. The chapter provides a summary of the findings of the thesis and explores how these findings answered the research questions. Following this, there is an exploration into perceptions of the definition and prevalence of NPS in order to provide insight into how participants conceptualised the consumer product, in this case NPS, being diffused. The four components of Rogers' theory are then discussed in relation to the findings of the four studies conducted. The components are the innovation itself, communication channels, time and the social system. The theory is then analysed in its appropriateness to describing the diffusion of NPS as a whole. The novel contribution of this thesis and strengths of the research are then summarised and recommendations for future research in this area provided. Finally, a reflection on the thesis, the limitations of the research and a final conclusion are provided.

Research Questions

The aim of this thesis was to explore the diffusion of NPS in the UK. The research aimed to investigate why different NPS diffuse and others fail to diffuse, to identify appropriate public health interventions to reduce harm. The thesis was framed by Rogers' DOI in relation to the diffusion of NPS. The key research questions asked were:

- Is Rogers' Diffusion of Innovations theory applicable to NPS?
- According to the theory, what are the reasons why some NPS diffuse and others fail to diffuse?
- Do external factors, such as drug policy, including the 2016 UK Psychoactive Substances Act, influence diffusion?
- Which of Rogers' adopter categories might be most at risk of harm from NPS use?

The key research question was whether Rogers' DOI is applicable to the diffusion of NPS. The DOI can be seen to be applicable for explaining the diffusion, and rate of diffusion, of an NPS product. It is important however, to emphasise that the theory should be used in application to different individual NPS; NPS should not be classed as a whole homogenous group. Additionally, when comparing adopter categories it may be more beneficial to examine the diffusion in terms of different drug categories. For example, through looking at SCRA products and why one SCRA product would

diffuse over another as opposed to comparing why a SCRA product may diffuse over a synthetic opioid because of the different user groups and motivations for use. In the study by Palamar et al (2015), the disparity between SCRA users and users of other NPS was emphasised and a number of the findings of the study were not seen as applicable to SCRA users, such as employment status. Palamar et al (2015) therefore explained that SCRA users may have different motivations for NPS use compared to users of other NPS. Whilst drug users could be seen to represent members of a social system, the preference for different drug categories may create separate social systems.

This is a similar finding in the literature. Sutherland et al (2017) highlighted the benefit in introducing prevention methods for appropriate groups to distinguish between ‘opportunistic’ substance displacement and the use of NPS in their own right. They also explained that owing to the vast range of NPS, it is unsurprising that there are different motivations for use of different NPS. Significant variations in motivations for use was a finding in the work by Soussan and Kjellgren (2016). Findings relating to diffusion in this thesis are likely to be specific only to the UK and it should be noted that there will be variations in NPS use motivations which are country specific such as legal and social contexts (Sutherland et al, 2017). Additionally, the framing of this thesis in relation to NPS users was highlighted in the Introduction (see Chapter 1) however it is important to emphasise that the application of the DOI to NPS was done so in relation to low-risk drug users with freedom of choice of NPS in a drugs market. It was not applied to all NPS using groups, in particular high-risk, problematic drug users.

The motivations for NPS use will vary between an individual in a prison setting, a psychonaut, an injecting NPS user and a young experimenter. For individuals in a prison setting, motivations for SCRA use will include their lack of detection in drug tests, their effects, accessibility and price (HMIP, 2015) and these motivations for use may continue after individuals have left the prison system (Ralphs et al, 2016). A psychonaut is likely to choose an NPS based on its psychopharmacological effects and possibly low chance of negative side effects. For an injecting NPS user, for example using mephedrone, Van Hout and Bingham (2012: 193) explained that key relative advantages will be availability, ‘attractive pricing’ and ‘perceived similarities’ to MDMA and cocaine. For a young experimenter who has no previous drug using experience, legality, accessibility and perhaps marketing are likely to be key relative advantages.

A further research question asked why, according to Rogers’ theory, some NPS diffuse and others fail to diffuse. It would appear that the key reason for the diffusion of an NPS would be the psychopharmacological effects, including side effects, of a product. This is applicable to a psychonaut exploring a hallucinogen NPS. It is also applicable to an individual using a SCRA product to escape mentally from a current setting, for example an individual using SCRA in prison. It is also applicable to an experimenter using an NPS to socialise with their friends in a clubbing setting. NPS

have not diffused and reached the popularity levels of traditional illegal drugs because they do not have comparable or superior psychopharmacological effects. The importance of friendship networks and increasingly online forums should also be acknowledged. However, unless a product has the psychopharmacological effects desired by an individual, despite positive feedback from friends and on forums, it is unlikely to diffuse.

The third research question asked which of Rogers' adopter categories might be most at risk of harm from NPS use. Although, this adopter category implements measures to mitigate the risks involved with NPS experimentation, as the first adopter category to adopt an innovation, innovators should be seen as the category most at risk of harm. When NPS first appear and before they complete successful diffusion, they will be experimented with by innovators where there is likely to be no research conducted on their short or long-term health effects. For later adopter categories, such as the early and late majority, substances which pose high levels of harm are unlikely to diffuse to these adopter categories if they are not endorsed by opinion leaders or change agents due to their risk of harm. It is important to emphasise that this research question is framed by Rogers' DOI; it is not argued that innovators are the user group most at risk in general in comparison to problematic drug users but more in relation to their positioning as the first adopter category experimenting with NPS at the beginning of diffusion.

The final research question related to the extent to which external factors such as the 2016 UK PS Act will affect diffusion. The obvious effects which the Act will have on diffusion affect the relative advantages of the innovation. Additionally, the mass media may be affected in that there may be less interest in reporting stories on NPS because they are no longer legal and therefore there may be less awareness of NPS from this communication channel. In terms of relative advantage, this will relate to the change in legal status whereby NPS will not have the advantages of accessibility or legality which were relative advantages especially in relation to traditional illegal drugs. It remains to be seen the extent to which this will affect the diffusion of an NPS and the extent to which these were important relative advantages. However, the external factor of the introduction of legislation affects the diffusion of NPS as a consumer product in relation to the DOI theory. It may therefore be important to acknowledge drug policy as an additional component of the theory in affecting the diffusion of NPS and drugs more generally. Nevertheless, it is unlikely that the PS Act will have a transformative effect on the use of NPS by all drug-using groups. Similar to the manner in which the emergence of NPS did not have a transformative effect for all drug-using groups; instead it affected different user groups in different contexts. For example, the growth in SCRA use for vulnerable populations and in prison populations and the emergence of mephedrone for clubbers. The success of the PS Act should therefore not just be viewed for its overall effect but instead in affecting the use of NPS by different user groups.

Research studies undertaken

This thesis implemented a mixed methods approach. The first study undertaken for this thesis involved a critical analysis of Rogers' DOI and its applicability when applied to the diffusion of NPS (Study One). Following this, two sets of interviews were conducted. The second study of the thesis involved interviews with online NPS UK-based retailers (Study Two). The third study comprised interviews with NPS professionals including law enforcement professionals, drug policy organisations and NPS EWS representatives from Europe, America and Australasia (Study Three). The final study was an empirical investigation of hypothetical drug preferences using a CBC methodology with drug users aged between 18 and 35 (Study Four).

Summary of findings

Diffusion is the process whereby an 'innovation is communicated through certain channels over time among the members of a social system' (Rogers, 1983: 34). It is a special form of communication because the messages which are being spread are new ideas. The findings of this thesis are that Rogers' DOI can be seen as appropriate in explaining the diffusion of NPS. The reasoning behind the decision to use the theory was that NPS exist as consumer products, albeit ones that are often subject to different types of regulation, and should be subjected to the same influential factors like other consumer products which are perceived as being 'new'. Through Study One this was determined as being accurate. NPS were seen as being consumer products by the retailers (Study Two) and factors which would affect other consumer products such as price, effects and accessibility were seen to be important for the diffusion of NPS. Similar findings emerged from the interviews with the professionals (Study Three). The importance of communication channels through which an individual is persuaded to adopt or reject an innovation was also identified as being applicable to NPS in the influence of friendship networks, online forums and the media. Study Four helped to identify the key relative advantages of an NPS product among current drug users through the CBC experiment where side effects and desired effects were determined to be the most important attributes of a hypothetical NPS. Through data collected in Study Four, prevalence of current NPS among the sample could be determined in addition to examining the importance of different communication channels; friendship networks were seen to have the greatest influence and the media the least influence. NPS prevalence was not perceived to be at the level of traditional illegal drugs (All Studies).

The impact of the PS Act was explored in Studies One, Two and Three. NPS prevalence rates and the findings of drug purchasing sources could be interpreted as having been affected by the PS Act

(Study Four) as it was implemented prior to this study being conducted. The PS Act was perceived negatively by the majority of professionals and retailers interviewed (Studies Two and Three) with the exception of the more senior police representative. The implementation of the Act was seen to affect the diffusion of NPS mainly in relation to the relative advantages of the products compared to other illicit drugs (Study One). NPS use following the Act was predicted to be affected in that existing NPS users were predicted to source their products through the underground market or revert back to traditional illegal drugs (Studies Two and Three). Successful diffusion of an NPS product may become more difficult now that NPS have lost the relative advantages which separated them from traditional illegal drugs and this will be explored in this chapter.

The implementation of the PS Act had a significant impact on the conduct of the research described in this thesis. This was especially the case in Studies Two and Three, where the Act had an obvious impact on discussion in the interviews. The effect of and issues involved with interviewing 'elites', whilst policy processes take place, in real time remains underexplored (Lancaster, 2017). However, exploring perspectives as the policy process unfolds is beneficial for the opportunity to explore dynamics, contestation and different perspectives, in contrast to interviewing people about past events where they can draw on established narratives (Lancaster, 2017). The Act can be seen to have an effect on certain aspects on the applicability of Rogers' theory to NPS diffusion, and these will be explored in this chapter, however the theory can still be used to explore NPS as a consumer product, albeit an unconventional product, despite the change in legal status.

The definition of NPS and prevalence

In order to assess the applicability of Rogers' theory, it is first necessary to examine the context of diffusion of NPS through exploring the perception of the definition and prevalence of NPS from the four studies conducted.

The definition of NPS

The definition of NPS was mainly discussed by the professionals (Study Three). They perceived that NPS were not well defined and offered different definitions as there was a range of views on what the term 'NPS' related to. The volume of different NPS and the diversity of the market extending beyond headshop products to include fake prescription medicines was acknowledged. The retailers who were interviewed (Study Two) distinguished between two categories of NPS: the 'legal highs' and the 'research chemicals'.

The lack of consensus between interviewees on the definition of NPS is problematic. This is heightened with the introduction of the PS Act. However, Reuter and Pardo (2017) suggested that the blanket ban that comprises the PS Act has meant that all the ambiguity associated with the phrase 'legal highs' has been removed.

The prevalence of NPS

In terms of the questionnaire (Study Four), and the extent to which different NPS have diffused among the sample, the most common NPS used was nitrous oxide. Additionally, 'ever use' of SCRA was 20.5% but only 3.7% had used SCRA in the last year. To put this in context, 'ever use' of cannabis was 95.8% with last year use at 27.9% and 'ever use' of MDMA was 68.4% with last year use at 25.8%. These findings appear to be similar to the views of the professional who worked at a young person's drug treatment service (Study Three); they believed that there was a not high level of NPS prevalence among young people although they similarly stated that SCRA were the most popular NPS.

The prevalence of NPS was addressed by both sets of interviewees (Studies Two and Three). The perception of prevalence of NPS use in the retailer interviews (Study Two) was that the market had grown in recent years. Interestingly, all the retailers stated that the most popular NPS they sold were SCRA products. Whilst it was acknowledged by the interviewees (Study Three) that NPS prevalence was an issue, in terms of harm, they perceived that use had been exaggerated and use was not at the level of traditional illegal drugs, although among certain user groups such as the prison or homeless

population, use was high. The challenges in actual quantifying use were also acknowledged by the interviewees (Study Three).

There was a perception (Study Three) that the majority of NPS introduced to the market do not successfully diffuse in the UK with the exception of mephedrone and possibly some SCRA. Therefore there are not high levels of prevalence. Internationally, the variation in use of different NPS between countries, questions the successful diffusion of any NPS. Although the findings of the questionnaire (Study Four) replicate similar findings in the literature, this questionnaire was not intended to be representative, and is likely to underrepresent key user groups such as vulnerable populations using SCRA and therefore findings are not generalisable. Finally, the focus of this thesis related to choices made by drug users as opposed to prevalence levels, this is especially applicable in Study Four.

Diffusion of Innovations theory

The Innovation Itself

The first aspect of Rogers' theory is the innovation itself and comprises relative advantage, compatibility, trialability, complexity and observability. Having analysed these factors across the studies conducted; relative advantage is the most important to the diffusion of NPS. Nevertheless, the compatibility and trialability of an innovation can also be applicable and this relates to marketing, and curiosity about drug effects. Although in Study One observability was viewed to be an important aspect of the innovation itself, the focus of observability was instead analysed in relation to the roles of friendship networks and online forums in the context of the second element of Rogers' DOI: communication channels.

Compatibility

Marketing

The compatibility of an innovation can be seen to link to the marketing of the NPS product including the name of the product (Study One). Unsurprisingly, retailers (Study Two) perceived that the packaging and naming of products was an important reason why a product may become popular. However, they acknowledged that this was likely to extend only to particular user groups such as those purchasing 'legal high' products in headshops and not to more experienced drug users who would be using 'research chemicals' as opposed to 'legal highs'. The only professionals (Study Three) to perceive the importance of marketing on NPS diffusion were the police representatives and only one perceived that the name of a product could have an impact on its diffusion. The names and packaging of NPS were designed to appeal to the younger population and therefore it may be the case that the PS Act will affect this user group as the marketing will be less visible. The study by Addison et al (2017) involved interviews with 15 police staff and 25 self-identified NPS users. The NPS users in this study described the appeal of the marketing of NPS and they recognised the deliberate naming of products to appeal to younger users (Addison et al, 2017). Similarly, to many attributes, the importance of marketing is likely to differ between user groups; the packaging and name of a product alone would be unlikely to affect the choices made among experienced drug users. The marketing may encourage individuals to try a product; but if other attributes are not present which make the product desirable such as price or a low number of side effects then it is unlikely to diffuse.

Trialability

Curiosity

The trialability of an innovation in relation to NPS relates to curiosity and experimentation. There is likely to be an increase in adoption if there is an opportunity to trial a product (Study One). Experimental NPS use is likely to become more difficult with the introduction of the PS Act as there will be reduced accessibility and a changed legal status. Curiosity was seen as a motivator for *initiating* NPS use, along with boredom and peer pressure (Deligianni et al, 2017). In the study by Barratt et al (2013) which comprised a questionnaire undertaken by 316 Australian SCRA users, a reason for ‘first use’ as reported by half of the sample was curiosity in comparing the effects of SCRA to natural cannabis.

Curiosity as a motivation is not unique to NPS as it extends to motivations for traditional illegal drug use (Stephenson and Richardson, 2014; Soussan and Kjellgren, 2016; Van Hout and Hearne, 2017). In the study by Vandrey et al (2012) examining motivations for SCRA use through an online questionnaire with SCRA users, the study by Shimane et al (2015) exploring NPS use in Japan and in the Global Drugs Survey (2016), curiosity was the primary reason for use. It is difficult however, to quantify this as experimentation or continued use. Both the retailers and the professionals (Studies Two and Three) recognised the importance of curiosity as a reason for NPS use although a number of professionals suggested that use was likely to be single use and not continuous.

Whilst curiosity may encourage experimenting; curiosity does not suggest prolonged use. This is likely to relate to other factors such as the severity of negative side effects or desired psychopharmacological effects. Therefore, whilst curiosity can represent a motivation for NPS use in general, extending this to be applied to Rogers’ DOI as an aspect of the ‘innovation itself’ to explain why a certain NPS product may diffuse is more challenging. For example, a number of interviewees in Study Three suggested that experimenters will only try an NPS a few times but not commit to more regular use. This is likely to relate to the relative advantages of a product. If an NPS does not provide enough relative advantages especially the psychopharmacological effects and lack of side effects, then use is unlikely to continue beyond experimentation. It would appear that curiosity is more short-term but if a product has desirable psychopharmacological effects than curiosity may play a role in its diffusion.

In conclusion, the other four attributes (excluding relative advantage) of the innovation itself appear applicable to the diffusion of NPS. For an NPS product to diffuse successfully and quickly it will need to have high levels of compatibility with existing beliefs and practices involved in the drug using behaviour of the individual. It will also need to be available for trialling before an individual

will fully commit and it will also need to have low levels of complexity to ensure ease of adoption and therefore diffusion. Finally, the benefits and use of the product will need to be easy to observe. However, the most important aspect of the innovation itself will be the relative advantages it offers.

Relative Advantage

The relative advantage of an NPS product can be seen as the most important aspect of an innovation to determine successful or unsuccessful diffusion. Assessing NPS relative advantages can help determine what the reasons will be why some NPS diffuse and others will not.

Price

The price of an NPS as a relative advantage is the extent that an NPS product would be superior in costs to existing products: existing traditional illegal drugs or alternative NPS products (Study One). All the retailers (Study Two) suggested that price should be a secondary relative advantage, with its importance dependent on other relative advantages such as psychopharmacological effects or lack of negative side effects associated with the product. There was more variety among the professionals (Study Three) on the importance of price with some suggesting that it was a primary motivation and others similarly suggesting that it existed as a secondary advantage.

Other studies support price being an indirect determinant of product popularity especially in partnership with desirable psychopharmacological effects or similarity to substances such as mephedrone (Van Hout, 2014; Sande, 2015; Barnard et al, 2017). Mephedrone was seen as providing 'good value for money' but also with comparable psychopharmacological effects and fewer side effects than other drugs (German et al, 2013). In the study by Addison et al (2017), the NPS users perceived that NPS were better value for money because of the potency of their psychopharmacological effects in comparison to traditional illegal drugs. Other studies also found the importance of price based on comparative prices of existing traditional illegal drugs among both non-users and users (Barnard et al, 2014; Deligianni et al, 2017) and solely among users (Bilgri, 2016).

The importance of price for different user groups was recognised by the professionals (Study Three). In the CBC (Study Four), 'price' was identified as holding the second lowest importance (14.0%), behind 'accessibility', among all the attributes across the total sample but also within each Latent Class. Although there was a clear ordering of the attribute levels among the total sample, this was not the case for the different Latent Classes and this emphasises the differing importance of price for different user groups. Both groups of interviewees (Studies Two and Three) agreed that NPS were

cheaper than traditional illegal drugs. However, the PS Act and the closing of headshops and clearnet online markets is likely to have an effect in movement to cryptomarkets and the impact this will have on price is unclear. The EMCDDA and Europol (2017) studied daily NPS sales on cryptomarkets between 2011 and 2015 originating from the EU, Norway and Turkey and found that sales rarely exceeded €3000 per day (EMCDDA and Europol, 2017). These sales were mainly focused on hallucinogens. However, the UK was frequently noted as the origin of NPS sales which may help predict the impact of the PS Act on cryptomarkets sales: if the UK already has high levels of cryptomarket sales and the clearnet accounts for a large percentage of NPS sales then the PS Act removing the clearnet websites may lead to an increase in cryptomarket NPS sales from the UK. Indeed the report suggested that legislative changes affecting open sale would be likely to have an impact on the availability and sales of NPS on cryptomarkets and that NPS trade on the darknet market would expand in the coming years increasing availability of all NPS types (EMCDDA and Europol, 2017).

Research identified 1031 different darknet vendors selling substances including NPS (Aldridge and Décary-Héту, 2016) and the UNODC (2016) found that approximately one quarter of drug users reported using the internet for the purchase of illegal drugs (Duxbury and Haynie, 2018). Aldridge and Askew (2017) and Cunliffe et al (2017) referenced the work of Reuter and Kleiman (1986) who suggested that as the risk taken by drug sellers increases so does the price of illegal drugs; sellers are compensating for this risk by increasing the price. If the risk for sellers can be reduced then drug prices should fall (Aldridge and Askew, 2017) and therefore prices on cryptomarkets should be lower (Cunliffe et al, 2017). Cryptomarkets may be viewed as lower risk as they enable individuals to buy and sell through anonymising Tor software which makes it more difficult for law enforcement to identify the marketplace activity of an individual (Lewman, 2016). They may also be higher risk however, as law enforcement can access entire purchasing history or through the risks involved in postal delivery services; Aldridge and Askew (2017) explained that whether these constitute greater risks than the offline market was unknown.

Caulkins and Reuter (1998) studied the relationship between the impact of drug policy and drug prices and found contrasting evidence. In the UK, one gram of mephedrone reportedly cost £16 after its ban; an increase of £6 from before its regulation (Prosser and Nelson, 2012). In contrast, Miron (2003) explored the impact on drug pricing following an increase in drug law enforcement in the USA and found there was a price decrease. They acknowledged this as being contradictory to the theory that increased enforcement should lead to an increase in costs and consequently increased drug prices. These contrasting studies would seem to suggest that the impact of the PS Act on NPS prices and consequently usage appear difficult to predict. However, in relation to NPS, in the research conducted by Haden et al (2017: 3), SCRA, such as MDMB-CHMICA, were still 'easily available'

from non-UK based websites to customers in the UK and they had not seen a price increase of the substance following the introduction of the Act. Price alone appears unlikely to impact on the diffusion of an NPS product. Nevertheless, it is likely to be more important for particular user groups, for example vulnerable groups and younger users, who may choose a product based on price in lieu of an alternative relative advantage such as the purity of the product.

Purity

The purity of an NPS product as a relative advantage relates to purity levels in comparison with existing products (Study One). The purity of NPS was recognised as being a motivation for use in the literature (Matthews et al, 2017). Purity was frequently referenced in both sets of interviews (Studies Two and Three) in relation to the emergence of mephedrone, which was seen as having reliably good purity, at a time when cocaine and MDMA purity levels were low. Indeed, Measham and Newcombe (2016) highlighted the importance of purity in the emergence of NPS in Europe; however with an emphasis on their relative purity comparative to traditional illegal drugs.

Similarly to price, the perceived purity of NPS as a reason for use is made in comparison to the purity of traditional illegal drugs (Sande, 2015; Van Hout and Hearne, 2015). Sumnall et al (2011) identified the perception that NPS have a superior purity to that of traditional illegal drugs as a motivation for use. This is likely to relate to the idea that NPS are perceived as being unaffected by impurity or poor quality, as traditional illegal drugs may be (Van Hout and Brennan, 2011). This is despite the NPS manufacturing industry not having the same quality control measures as other industries such as the pharmaceutical industry (Nichols and Fantegrossi, 2014). In the study by Soussan et al (2018), there was a view that NPS were manufactured more professionally than traditional drugs, often labelled correctly and had a lower likelihood of being cut with adulterants. Consequently, the view was that the purity and quality of NPS was at a high standard and they were lower risk. Soussan et al (2018) emphasised that it was important to note the disparity between the perception of NPS as risky (Baumeister et al, 2015) and the findings in their own study of NPS being used for their perceived safety. The unpredictable nature of NPS however was also an incentive as it provided the possibility of ‘novel and exciting adventures’ (Soussan et al 2017: 76).

In the I-TREND study (Brunt et al, 2017), 31 different NPS were test purchased across five different European countries including the UK and Poland. One of the retailers in Study Two emphasised the importance of the reliable purity of NPS and in the study by Brunt et al (2017), they found that clearnet retailers advertised their NPS products at 90% pure or higher. However forensic analysis found that most of the powders, across the samples in all the countries, had a purity of 65% or above but the UK had the highest level of purity, at greater than 90%, whereas Poland had the lowest, at lower than 60% (Brunt et al, 2017). The study found a large variety in purity between different NPS

and explained that this was likely to relate to factors such as availability or the stability or instability of the drug market in each country.

It was noticeable that Poland also had the highest proportion of mislabelling, although containing chemically similar analogues to those listed on the packaging, in contrast to the UK where all the test purchases corresponded to the advertised contents (Brunt et al, 2017). In the study, the danger of mislabelling a substance was emphasised with the example of a-PVP, a stimulant, being sold under the guise of the less potent 4-FA. It should be noted that the testing took place before the PS Act was introduced and additionally none of the substances which were tested in the UK were considered at the time for inclusion under the 1971 MDA (Brunt et al, 2017). In Poland a blanket ban was introduced in 2010 but despite this the NPS market re-emerged in 2014 (Malczewski et al, 2015) with 100 brick and mortar shops (Brunt et al, 2017). Nevertheless, it would be interesting to conduct a similar study in the UK following the PS Act introduction and examine if there was any change in product purity and labelling. The disparity in both purity and mislabelling between the UK and Poland may change with the introduction of the Act in the UK. Indeed, Brunt et al (2017) suggested exploring the impact of the Act on both the domestic and the European NPS market.

Lack of detection

NPS, in particular SCRA (Werse and Morgenstern, 2012), have been identified as having a unique relative advantage in that some products cannot be identified in traditional drug detection tests used for employment and criminal justice screening (Bright et al, 2013; Bonar et al, 2014; Goggin et al, 2015; Bilgri, 2016; Soussan and Kjellgren, 2016). However, in the study by Soussan and Kjellgren (2016) which was a questionnaire completed by 619 international NPS users recruited through an online discussion forum, motivations for use to avoiding detection were 'significantly less endorsed' than other motivations such as 'pleasure and enjoyment' (2016: 16).

The importance of the lack of detection of NPS, predominantly SCRA in traditional drug tests, can be a relative advantage but only for specific populations. For example the prison population, military, police and safety critical industries (e.g. airlines) who are subjected to regular drug tests; it is unlikely to extend to the general UK population. Interestingly, whilst the majority of professionals (Study Three) focused on the lack of detection as a relative advantage for individuals within the prison population, the retailers (Study Two) focused on its importance in a workplace setting. This is perhaps whom they viewed as their customer base. The importance of the lack of detection in traditional drug tests was not explored in the questionnaire or CBC (Study Four) as it was determined as being a less important motivation for the sample.

The importance of the lack of detection in drug tests of NPS, again, differs between first time experimenters of NPS and experienced drug users. The lack of detection of a product in a drug test, unless within a particular population, is unlikely to be the reason that a product will diffuse over another product.

Legality

The legality of an NPS as a relative advantage equates to the cost-benefit analysis of its use over an illegal product; for example, ease of access and the costs of criminal market interaction (Study One). The importance of the (previous) legality of an NPS represented the most contentious issue in both sets of interviews (Studies Two and Three) and the critical analysis (Study One) conducted. Nevertheless, the previous legality or perceived legality of NPS was a motivation for use in various studies among users (Werse and Morgenstern, 2012; Goggin et al, 2015; Van Hout and Hearne, 2015; Bilgri, 2016; Soussan and Kjellgren, 2016; Wilkins et al, 2016; Barnard et al, 2017; Deligianni et al, 2017) especially the ease of acquisition and more convenient drug use (Soussan et al, 2018). Other studies, however, have found the importance of legality as a low ranking reason for NPS use (Sande, 2015; Soussan and Kjellgren, 2016) and both Measham and Newcombe (2016) and Van Amsterdam et al (2015) therefore questioned the deterrent value of criminalisation.

The importance of legality was not directly assessed in Study Four. However, the low level of importance attributed to ‘accessibility’, which could be seen as an associated advantage of legality, suggests that it would not be seen as important. This is however probably due to the respondent population who were all previous drug users, as opposed to first time experimenters who are likely to perceive legality as a more important relative advantage. Although there is limited evidence which confirms this (Stephenson and Richardson, 2014). Even among the retailers (Study Two), there were conflicting views on the importance of legality. These views ranged from legality as a key motivation for use, to having varying levels of importance for different user groups to having no importance. Interestingly, one retailer suggested that the legality of NPS would be important for ‘middle-aged people with good jobs’ who would not wish to interact with the criminal market. This retailer emphasised the varying importance of legality for different user groups; acknowledging different motivations and their levels of importance for different groups was a key finding in this thesis.

The professionals (Study Three) focused more on the importance of legality for younger people and experimenters, although the use by older users was also recognised. However, there were conflicting views on the importance of the avoidance of interaction with the criminal market and the idea that legality equated to safety. In terms of positive aspects of the PS Act, Stevens et al (2015) referenced the idea by supporters of the Act that the legislation will convey to potential NPS users that ‘legal

highs' are not safe. This was referenced by the senior police representative (P18) and an interviewee who worked for a charity (P4). P4 highlighted that whilst it may be obvious to academics and individuals working in drug policy, it may be less obvious to younger or first time drug users. Conversely, the interviewee from the drugs think tank (P20) suggested that the idea that individuals interpreted legal products as implying safe products was 'ridiculous'.

There was a wide range of views among the professionals (Study Three) regarding the importance of legality which ranged from the perception that legality of a product would be a decisive reason for its use to legal status having no effect. The study by Blackman and Bradley (2016), included perceptions of reasons for local interventions relating to NPS use among a drug service team and NPS legal status was seen as a key factor. Conversely, the young person's substance misuse team leader (P18) interviewed in Study Three perceived that legality held no importance for young people in choosing to use NPS.

Similarly to most other relative advantages relating to NPS, the importance of legality as a relative advantage will differ between different user groups. The varying levels of importance for different user groups was recognised in the literature: Sutherland et al (2017) explained that legal status will be a greater motivation for novice drug users without established contact with the illegal drug market. German et al (2013) and Measham and Newcombe (2016) however highlighted that the majority of NPS users will have a polydrug history and therefore will not be interested in legal status. It would appear that as NPS have not reached the same widespread use as traditional illegal drugs that legality may exist as a secondary relative advantage as opposed to the primary reason for the diffusion of a product. In their study, Sutherland et al (2017) found that legality was an 'opportunistic' reason for use of particular NPS and use of these NPS declined in use over time. In comparison, products which were used for reasons such as value for money or desired psychopharmacological effects equated to sustained use.

In conclusion, the diffusion of NPS products following the PS Act is likely to reveal the importance of legal status. The literature suggests that legality exists more as a secondary relative advantage as opposed to a primary advantage; the associated benefits of legality will make a product appear appealing but additional relative advantages are needed for successful diffusion. Andersson and Kjellgren (2016) found in their study that individuals would 'settle' for NPS as substitutes for traditional illegal drugs to avoid the challenges associated with traditional illegal drugs which suggests the importance of legal status previously. However, with the PS Act, these challenges will become equivalent to those of sourcing traditional illegal drugs and therefore a new NPS would need to offer a different relative advantage to have a chance of completing successful diffusion.

The professionals (Study Three) and, unsurprisingly, the retailers (Study Two) had mainly negative perceptions of the PS Act. Both groups criticised the definition of psychoactivity and perceived the Act as being a confusing piece of legislation, both for themselves, but also for NPS users. The professionals viewed the Act as positive in relation to the removal of the visible aspect of NPS. This was also acknowledged as a consequence of the Act by the retailers. The retailers however, saw this as increasing the harm associated with NPS use as they would no longer be able to label products. Additionally, owing to the change of legal status, retailers perceived that individuals may be less likely to seek medical help. In relation to Rogers' theory (Study One), the most obvious change relating to the diffusion of NPS will be to the innovation itself where following the PS Act, NPS will lose their relative advantages of accessibility and legality. Consequently, these are likely to impact on purity, price and their appeal in comparison to traditional illegal drugs.

The report by the Home Office (2016) which summarised the PS Act six months after implementation, stated that 500 individuals had been arrested but this had only led to four individuals receiving custodial sentences. The impact of the PS Act is difficult to assess because it is a relatively new introduced piece of legislation. Nevertheless, the effectiveness of criminal legislation in general to drug prevalence has been explored. However, Measham and Newcombe described this evidence base as weak stating that there appears to be 'little impact of drug policy change on drug use in a range of different jurisdictions' (2016: 590). Freeman and Curran (2012: 1904) instead explained that drug users are likely to act according to behavioural economic principles; the drug of choice will 'shift dynamically' according to changes in price, purity and availability.

There will be a review of the PS Act 30 months after its commencement and therefore a framework was undertaken by the Home Office in July 2017 to explain their approaching to reviewing the Act but also to outline key research questions which the main review will examine (Home Office, 2017b). The logic model used for the PS Act included five stages (Home Office, 2017b). Stage one, 'inputs', comprised the Act legislation and the use of resources to implement it. Stage two, 'activities', involved the policy aim which aims to stop psychoactive substance sales by retailers. Stage three, the central 'output', is to reduce the availability of psychoactive substances. Stage four, the main 'outcome', in short or medium-term consequences, is to reduce the use of psychoactive substances. In terms of stage five, 'impacts', which are longer term, the aim is to reduce the health and social harms associated with psychoactive substances use (Home Office, 2017b). The model also acknowledged the likelihood of 'displacement'. 'Displacement' occurs in both supply of and demand for psychoactive substances following the Act. In terms of supply, displacement may take place through the development of an illicit market for psychoactive substances. In terms of demand, this is likely to take place through users of psychoactive substances using alternate substances which may or may not be harmful (Home Office, 2017b).

The 'activities' involved in the implementation include challenges of enforcement. Therefore one of the questions asked in the Home Office report related to whether the new police powers were being used or whether they had been problematic to implement (Home Office, 2017b). Additionally, one of the questions relating to enforcement involved asking whether 'stop and search' had increased under the MDA owing to possession not being an offence under the PS Act. For this research, in Study Three the junior police representative (P10) gave the impression that the complexity surrounding the definition of psychoactivity meant that the focus of the police may be to seize more traditional illegal drugs instead of NPS. The policing challenges associated with the PS Act were raised by various professionals (Study Three).

In relation to 'outputs', research questions related to the sales and availability of psychoactive substances. This included asking whether the number of new psychoactive substances emerging in the UK had reduced because of a lack of innovation as products no longer need to evade legislation (Home Office, 2017b). Further research questions asked included whether headshops were still selling psychoactive substances and whether this had led to any shops closing. For clearnet retailers, key research questions included whether UK registered sites had closed down and whether this had led to a displacement to the darknet or non-UK registered clearnet sites (Home Office, 2017b). The potential increase in cryptomarket use following the PS Act was mentioned by interviewees in Study Three. Additionally, the interviewees perceived that shops previously selling NPS would either close down, change what products they were selling or continue to sell NPS but 'under-the-counter' (P8). The police representative (P10) also stated that since the introduction of the PS Act that there was nowhere 'obviously' selling NPS. In terms of the closure of clearnet websites, in Study Two, one of the websites of the retailers is still in existence but the website has returned to selling cannabis seeds. Another website is still in existence selling NPS although it is stipulated that products sold are 'ban exempt research chemicals'. The third website has closed.

The main research question relating to 'output' related to prevalence and whether the use of psychoactive substances has been reduced as a consequence of the introduction of the PS Act. However, it was acknowledged due to the existing low prevalence of NPS that this would be difficult to identify (Home Office, 2017b). Furthermore, a question will be whether the change in availability had been driven by their reduced availability and whether any reduction in psychoactive substance use had been the steepest in particular populations (Home Office, 2017b). Reuter and Pardo (2017: 2) identified three NPS user groups: 'those skirting the law', 'those seeking a new drug similar to an existing drug but not easily detected in random drug tests' and 'those seeking a new and attractive experience'. They stated that it was necessary in policy analysis to keep the three user groups distinct as their motivations for drug use are driven by different dynamics. The motivations of different NPS user groups using NPS and the impact on diffusion was acknowledged for this thesis. In relation to these groups, it was highlighted that the policy aim of the Act to remove headshops would only affect

the first group and therefore there would still be demand from the latter two groups for NPS producers (Reuter and Pardo, 2017).

Further in relation to ‘output’, it was highlighted that it would be important to examine whether previous NPS users had turned to other substances such as traditional illegal drugs or medicines. In the interviews conducted (Study Two and Three) it was suggested that there would be ‘a mixture’ (R2) of previous NPS users choosing to use traditional illegal drugs instead of NPS and some individuals continuing to use NPS obtained through the illicit market whether underground or online. Generally, however, the interviewees perceived that it would be more likely that previous NPS users would revert to traditional illegal drugs as NPS had lost their advantages of legality and accessibility and possibly cheaper price.

Finally, the key ‘impact’ of the PS Act is intended to be the reduction of the health and social harms associated with psychoactive substances use. Factors include the effects of enforcement, availability (whether this involves movement of the NPS market to the illicit trade and organised crime groups) and prevalence (whether this involves users displacing use to other substances which may have adverse social harms) (Home Office, 2017b). The potential involvement of organised crimes following the Act was recognised by two interviewees (Study Three). However, more interviewees recognised the transition in harms from the movement of a quasi-legal market to an illegal market.

The retailers (Study Two) also recognised the social and health harms involved in the transition to an illegal market and also referenced the end of accurate labelling associated with the previous quasi-legal market. Furthermore, the retailers stated that this market change may lead to individuals becoming less willing to seek medical help. The interviewed retailers therefore appeared to question the key ‘impact’ of the PS Act in reducing health and social harms. Reuter and Pardo (2017) used the example of the ACMD noting that with the scheduling of each round of SCRA that each successive round had been more potent than the previous round. From this logic, it should be the case that a total ban would lower the risk of every new substance posing a risk of being dangerous or popular. However, although the ‘cat and mouse’ game involved with NPS innovation will be removed in this sense, other harms related to obtaining NPS from illegal market will appear. In relation to the framework, it can be seen that key research questions identified by the Home Office were also acknowledged by the interviewees (Studies Two and Three).

Reuter and Pardo (2017: 4) highlighted that under a total ban the government cannot be seen to be ‘simply reactive’ and the need to introduce legislation that was not reactive was recognised by both sets of interviewees (Studies Two and Three). However, in the study by Reuter and Pardo (2017: 5) they highlighted the three main criticisms of the PS Act: the ‘overly broad and confusing’ psychoactivity definition, the difficulty in operationalising this definition in terms of enforcement,

which were both also highlighted by Stevens et al (2015), and the lack of separating dangerous from low-harm NPS in punishing offenders in contrast to the MDA. In relation to the definition of psychoactivity, it was highlighted that it was not currently possible to predict whether a substance may have a psychoactive effect, according to the PS Act, through examining its chemical structure (Stevens et al, 2015). Stevens et al (2015) explained that these legal and psychopharmacological problems will lead to challenges in achieving successful prosecutions. Additionally, Stevens et al (2015) highlighted the ‘inherent difficulties in attempting to ban everything that may be psychoactive and then creating exemptions’ through the example of nitrous oxide. This is owing to its use as an anaesthetic and food additive, therefore manufacture and sale would be permitted for certain uses. Nitrous oxide was singled out by the senior police representative (P19) as an example of the PS Act being able to have a large-scale impact.

It was noticeable that the majority of the criticisms identified by Reuter and Pardo (2017) featured frequently throughout the professional interviews (Study Three) and in the retailer interviews (Study Two), albeit less frequently. However, there was no reference to the lack of separating dangerous from low-harm NPS in punishing offenders by any interviewee.

A couple of studies have been conducted since the PS Act was implemented. For example, in the study by Young Addaction (2017) which comprised a questionnaire with 1,604 young people, the young people stated that the Act had not deterred them from NPS use but that NPS had become more difficult and more expensive to access since its implementation. In addition, some of the sample explained that they had reverted to traditional illegal drugs because of the changes in price and accessibility of NPS (Young Addaction, 2017). This was perceived by the professionals (Study Three) as a likely consequence of the PS Act. This was a similar finding in the study by Addison et al (2017) which involved interviews with police and NPS users, the majority of which had previous traditional illegal drug use. Individuals in the sample stated that they were accessing NPS illicitly and through friends; few were using the internet to access NPS (Addison et al, 2017). Addison et al (2017) however suggested that the impact of the Act on supply and availability of NPS had restricted use for new and experimental users. The sample in the Addison (2017) study was relatively small so its findings should be approached with caution; nevertheless, it offers an important insight into NPS use following the PS Act.

In the study by McElrath and O’Neill (2011), the majority of respondents stated that following the Irish legislation they had continued their use and purchasing of mephedrone. This may be related to the nature of the sample; because the majority of their sample were previous drug users, the legal status change was unlikely to affect them to the extent that it may influence novice drug users. The impact of a blanket ban will have differing impacts on NPS user groups. Reuter and Pardo (2017) stated that the UK Act will only reduce the demand for NPS products among those wishing to evade

prohibition. It will not however, address the issues of individuals choosing to use NPS for evading drug detection and as new sources of pleasure. In the literature, Smyth et al (2017) explained that the implementation of Irish NPS legislation had not eliminated NPS use and they found evidence of use of a range of NPS in the six to twelve months following the implementation of legislation. The example of Irish NPS legislation was recognised by both the retailers (Study Two) and the professionals (Study Three) in relation to the UK PS Act and its effectiveness.

Side Effects

The importance of a lack of undesirable side effects as a relative advantage was most apparent during the CBC study (Study Four) where it was deemed the most important attribute across the whole sample. This attribute had the highest utility scores which emphasised its importance. ‘Side effects’ and ‘desired effects’ accounted for a combined importance percentage of 61.49%. In the questionnaire by Freeman et al ‘lack of long or short term harms’ were among the most important attractions for the use of a ‘hypothetical new high’ (2012: 799).

Side effects in relation to the DOI refers to the extent in which a product should have minimal negative side effects or at least negative side effects which are perceived to be outweighed by the positive psychopharmacological effects (Study One). If an NPS product has extreme negative side effects, despite its alternative relative advantages, it is unlikely to diffuse. For SCRA, it may be seen that these products have high levels of negative side effects. However, the populations in which use of these products takes place are likely to have different relative advantage priorities than the general population. SCRA, in comparison to natural cannabis, were mentioned by a couple of professional interviewees as possessing negative side effects which are undesirable enough to discourage users to choose SCRA over natural cannabis. This however, would only be applicable to certain populations. The retailers (Study Two) only minimally referred to side effects and this was in choosing which products to sell on their website. For example, one retailer highlighted the removal of a product because of the reported negative effects by users.

There was a lack of attention paid to side effects by the retailers (Study Two), whereas it was deemed very important by the drug using population of the questionnaire and CBC (Study Four). There were two occasions during the professional interviews (Study Three) where questions were asked on the importance of side effects to diffusion and the interviewees (ACMD representative and drug charity representative) answered in a way which separated themselves from drug users through stating that they would not know the importance of side effects as they were not drug users. This was an interesting observation and it highlights the differences between the different stakeholders involved in the thesis.

The use of NPS involves consuming substances which have unpredictable and uncertain long term and short-term effects. This separates them from the majority of traditional illegal drugs which have ‘decades of research’ on them (Fernández-Calderón et al, 2018: 86). The perception of NPS existing as safer than traditional illegal drugs, especially in relation to their (previous) legality, has been recognised and debated in the literature (Sumnall et al, 2011; Gonzalez et al, 2013; Vandrey et al, 2013). However, the risk of use, in physical and social harms, may increase following the PS Act as a result of variations in the content and purity of NPS products existing in an unregulated, criminal market (Measham and Newcombe, 2016). Atkinson et al (2016) explored the health responses to NPS. They explained that there needed to be attention paid to the different NPS user groups and therefore responses to NPS use, including the adaption of existing interventions which should adapt to these unique needs and harms. The study also highlighted the importance in recognising that individuals experiencing harms associated with NPS use may not meet the criteria for a substance use disorder or they may not present themselves to treatment services. This is a public health concern and Atkinson et al (2016) explained that it has become an increasing priority to create and implement public health responses effective in addressing problems associated with NPS use.

In the study by Addison et al (2017), the public health challenges faced by the police staff were addressed. The impact of NPS on the police was addressed in Study Three. This was especially noticeable in relation to P10, who emphasised the challenges involved in policing NPS and the consequences of their use. The staff, in the study by Addison et al (2017), recognised NPS as presenting a new challenge, especially their unpredictability in effects and side effects, and they felt ill equipped and under-resourced to know how to deal with it. This was also mentioned in contrast to traditional illegal drugs, where police staff felt they had a greater ability to deal with their effects and side effects. However, this was complicated with the existence of poly-drug use (Addison et al, 2017). Addison et al (2017) explained that this could be addressed through relieving some of the workload impact NPS use has on the police and conducting research on the health consequences of NPS use including costs to services and addiction.

Similarly, Wood et al (2016) found in their study that healthcare professionals were less confident and had less knowledge surrounding NPS and managing acute NPS toxicity in contrast to traditional illegal drug use. Individuals in the study were asked about sourcing information about NPS and how they kept their knowledge up-to-date. The interviewees indicated that they did not receive training or they received low levels, and therefore they relied on colleagues or service providers to gain appropriate knowledge (Campbell et al, 2017). Campbell et al (2017) referenced the guidance from Abdulrahim and Bowden-Jones (2015) that existing knowledge and training could be applied to NPS; however, the new substances, populations and harms needed to be acknowledged. One of the findings in the study by Campbell et al (2017) related to interviewees who approached treating NPS harms in

drug categories, such as SCRA or stimulants, had higher levels of confidence than those who approached them in specific brand names such as ‘herbal haze’ or ‘china white’.

In Europe, the European Drug Emergencies Network (Euro-DEN Plus), which is supported by the EMCDDA, monitors drug-related emergency presentations across European countries to identify health harms associated with drug use (EMCDDA, 2016b). Public Health England (PHE) have launched a national system for reporting the adverse effects of NPS and other drugs in the UK through the ‘Yellow Card Scheme’ (<https://report-illicit-drug-reaction.phe.gov.uk/>). The system will help health professionals such as individuals working in emergency departments, general practices and drug treatment services. The system is incorporated into the wider work of PHE in developing a NPS information system to reduce the time lag between health harms associated with NPS use appearing and developing appropriate and effective treatment responses (<https://report-illicit-drug-reaction.phe.gov.uk/>). In addition, PHE have set up an NPS clinical network to analyse the data appearing from the new system and existing drug intelligence systems in order to identify NPS harms, patterns and identify appropriate clinical responses. The clinical network is formed of clinicians, front-line experts and government policymakers (<https://report-illicit-drug-reaction.phe.gov.uk/>). These actions by PHE highlight the growing concern surrounding the lack of knowledge of NPS short and long-term effects and the need to collaborate to develop this understanding.

Although the study by Dabrowska and Bujalski (2013) focused on the media, it included a wide range of perspectives on NPS including retailers, NPS users and experts. The retailers in the study, in relation to harm reduction, stated that because their products were not intended for human consumption they could not take responsibility for ‘inappropriate’ use of the products sold on their websites (Dabrowska and Bujalski, 2013: 33). This was also acknowledged by the retailers in this study (Study Two). One retailer explained that before the PS Act they could not act as a harm minimisation agent because the products were not sold for human consumption.

In the questionnaire (Study Four) 76.3% of the sample were ‘very likely’ or ‘likely’ to seek information about the harms or effects of drugs with only 3.7% answering that they would be ‘very unlikely’. Respondents were also asked about their harm reduction practices; the most popular practice was ‘avoiding frequent/heavy use of drugs’ (71.6%) followed by ‘purchase of drugs from a trusted source’ (67.4%). For seeking harm reduction advice, the most popular sources were from friends or acquaintances (59.5%) and from independent drug information websites (56.3%). These were similar findings in the study by Martinotti et al (2015), Sande (2015) and Van Amsterdam et al (2015). A ‘lack of negative side effects’ emerging as the most important attribute in the CBC exercise also highlights the importance of minimising risks potentially resulting from NPS use.

The public health challenges associated with NPS use (Tracy et al, 2017) should be recognised. Before the PS Act was introduced this related to the consumption of substances about which there was little or no research investigating toxicity, and purchasers were using substances when they had little knowledge of their contents. Consequently, service providers faced challenges in knowing how to treat individuals without knowledge of what had been used. These challenges will remain following the introduction of the Act. However, the lack of information available will be heightened as the trade moves underground and individuals may become more reluctant to seek medical help with the change in legal status.

Psychopharmacological Effects

The psychopharmacological effects of a product were recognised in all the studies as being a key relative advantage. Through the critical analysis (Study One), the psychopharmacological effects as a relative advantage refers to the extent that an innovation produces effects which are preferential to other existing drugs or equivalent desired effects but enough extra relative advantages to supersede existing products. During both sets of interviews (Studies Two and Three), the importance of psychopharmacological effects was emphasised in relation to effects of existing traditional illegal drugs. The retailers (Study Two) explained that the effects of a product would play an important role in choosing which products to sell. The importance of the psychopharmacological effects was acknowledged in relation to mephedrone in the literature of the critical analysis and in the interviews of the retailers and professionals. In relation to mephedrone, whilst a number of reasons have been given to the reasons for its emergence, an important factor was the quality of effects which it offered (Van Hout and Brennan, 2011). Despite all the other reasons, mephedrone needed to produce effects which individuals wanted otherwise it would not diffuse.

The term ‘desired effects’ or ‘psychopharmacological effects’ is broad. Effects include experiencing ‘self-exploration’, ‘coping’, ‘sensation-seeking’, (Van Hout and Hearne, 2017: 103), ‘enjoyable effects’ (Soussan and Kjellgren, 2016: 5) ‘recreational effects’ (Kassai et al, 2017b: 2) and experiencing a ‘good high’ (Barnard et al, 2014: 50). Importance of desired effects was recognised as a key motivation for NPS use in a number of studies (Vandrey et al, 2012; Corazza et al, 2013a; Deligianni et al, 2017) especially sustained use (Sutherland et al, 2017) and a wide range of effects (Gonzalez et al, 2013; Corazza et al, 2014a; Sande, 2015).

In the CBC (Study Four), the ‘desired effects’ was the second most important attribute (after ‘side effects’) in the total sample; however, this differed between the different Latent Classes. For example, whilst it was the most popular attribute for the ‘Balanced effects’ Class, it was second for the ‘Minimal side effects’ Class, but the third most important attribute for the ‘Drug Category focus’

Class and 'Price sensitive' Class. This is likely to have been impacted by both Classes choosing 'drug category' as the most important attribute which is strongly related to psychopharmacological effects. In both sets of interviews (Studies Two and Three), the importance of personal preference was also emphasised and this related to the psychopharmacological effects of the NPS products. Soussan and Kjellgren (2015) explained that for ethylphenidate, the stimulant possessed 'sought-after effects' including self-reported self-confidence and cognitive enhancement. Additionally, Kjellgren and Soussan (2011) explored the hallucinogen 4-HO-MET and the sought-after effect for this substance was self-exploration. This highlights the importance of personal preference of different effects for different user groups for contrasting substances (Soussan and Kjellgren, 2016). In their most recent study, Soussan and Kjellgren (2016) found that pleasure and enjoyment were the most popular reasons for general use of NPS.

The psychopharmacological effects of an NPS product appear, out of all the relative advantages, to be the most important. Indeed Brandt et al (2013) suggested that the reason for the lack of diffusion beyond particular groups related to effects not deemed desirable by users. Although 'side effects' were rated as the most important attribute during the CBC (Study Four), across all the studies psychopharmacological effects were consistently found to be a key relative advantage. The importance of psychopharmacological effects provides an interesting challenge for the PS Act; the Act will be limited in the extent to which it can stop the use of a product if individuals are choosing it for desired psychopharmacological effects and not simply because of availability or price.

The relationship between NPS and traditional illegal drugs

A relative advantage is the extent to which an innovation supersedes an existing product. In relation to NPS, this can be seen to relate to their relationship with existing traditional illegal drugs. In many studies, motivations for use of NPS were compared with traditional illegal drugs: for example whether they were cheaper, safer, perceived to have greater purity or availability (Gonzalez et al, 2013; Gunderson et al, 2014; Goggin et al, 2015; Hondebrink et al, 2015; Sande, 2015; Van Hout and Hearne, 2015; Stogner, 2015; Bilgri, 2016; Deligianni et al, 2017; Sutherland, 2017). In the critical analysis (Study One), it was concluded that the similarity, in psychopharmacological effects between NPS and traditional illegal effects, was extremely important to the diffusion of an NPS product. The reason for the increase in popularity of MXE related to its similarity in effects to ketamine (Corazza et al, 2012) and in the study by Sutherland et al (2016) the only consistent predictor of NPS use was the use of a larger number of traditional illegal drugs. One of the findings of this study (Study Four) related to individuals seeking out NPS which had similar properties to existing traditional illegal drugs that they were already using.

Following the subsequent three studies in the thesis (Studies Two, Three and Four) however, it was concluded that similarity in effects was not as important as the psychopharmacological effects of a product in isolation. For example, during the professional interviewees (Study Three) although the importance of the effects of mephedrone in relation to cocaine and MDMA were mentioned, the current importance of the similarity between NPS and traditional illegal drugs more generally was questioned. The interviewees stated that there were NPS which ‘matched’ traditional illegal drugs in their broad range effects. However, these were ‘poorer’ versions of traditional illegal drugs, which had less desirable effects and more unwanted side effects, for example SCRA compared with cannabis and this was why NPS had not diffused to the extent of traditional illegal drugs.

The introduction of the PS Act had an important impact upon the relationship between traditional illegal drugs and NPS. The importance of the similarity of psychopharmacological effects between traditional illegal drugs and NPS appeared to diminish with the introduction of the Act. For example, individuals may have chosen to use a NPS version of MDMA because of the ease of access and its legality. However, these relative advantages have been lost with the introduction of the Act so another relative advantage needs to be apparent for an individual to choose an NPS mimicking MDMA rather than actual MDMA. Nevertheless, the relationship between traditional illegal drugs and NPS is still important in terms of availability.

Availability

In this thesis, availability referred to the ability to obtain a substance in terms of geography. In the critical analysis (Study One), it was suggested that if a product was difficult to obtain then it was unlikely to diffuse. The availability of NPS, and drugs in general, has been recognised as a motivation for use in various studies (Sumnall et al, 2011; Van Hout and Brennan, 2011; Moore et al, 2013; Soussan and Kjellgren, 2016). Following the PS Act, the general availability of NPS is likely to decrease. This was recognised by the retailers (Study Two) who suggested that consequently, the price of NPS would be likely to increase and therefore two relative advantages would be lost which would mean that previous NPS users would be likely to return to traditional illegal drug use. Van Hout and Hearne (2015: 34) suggested that in their study on the use of SCRA, that availability appeared ‘first and foremost as a driver for introduction and use’, however other reasons such as boredom and peer socialization were given for *continued* use. Availability was similarly recognised as a short-term factor in the study by Sutherland et al (2017), whereas motivations which were based on preference or perceived ‘superiority’ over alternative drugs were likely to be more long-term. The professionals (Study Three) perceived that the importance of availability related to the availability of traditional illegal drugs but they also referenced examples of NPS products diffusing at a local level because of their availability. The New Zealand representative (P17) perceived availability as the most

important reason for the diffusion of a product (Study Three). This is noteworthy as they were the only interviewee to do so.

Similarly to purity, the importance of availability is relative to the access and availability of traditional illegal drugs and is likely to differ between user groups. For example, individuals experimenting with drugs for the first time and engaging in opportunistic use are more likely to be affected by availability than psychonauts who will seek out particular substances for their effects. Moreover, whilst an NPS must have acceptable levels of availability for diffusion to take place, it is likely that an innovation will need to have additional advantages such as price or desired psychopharmacological effects for successful diffusion. Following the PS Act, availability may become a more important relative advantage; the Act will remove the wide range of choice associated with NPS purchasing and therefore individuals are likely to choose products which are available. This is likely to lead to a narrowing of the NPS market where the only products available will be the products people want. However, this is likely to have different impacts for different NPS user groups. For example, individuals may choose to use cryptomarkets instead to access NPS products; but this will not be viable for all user groups. Therefore for these groups, availability will play a more important role.

Accessibility

Accessibility referred to the ease in which an individual can purchase a substance, for example through headshops or online retailers. The critical analysis (Study One) highlighted the previous relative advantage of NPS over traditional illegal drugs in terms of easy accessibility; however following the PS Act this had been lost. 'Accessibility' as an attribute was ranked as the least important attribute in each Latent Class and across the whole sample (6.71%) in the CBC (Study Four) and 'side effects' was five times more important. The retailers (Study Two) unsurprisingly perceived that the previous ability of individuals to purchase NPS through headshops and online retailers as a key relative advantage. They highlighted the lack of interaction with the criminal market for certain user groups, which was also recognised in the critical analysis, as well as the ease and safety of purchasing products online. The (previous) legality of NPS and lack of interaction with the underground market was an advantage in maintaining safety in the study by Soussan et al (2018). Soussan et al (2018) also suggested that the scientific community may underestimate the perceived threat of criminalisation and street dealer interactions in contrast to the risk involved with the potential harm of the drug effects. The previous ease of accessing NPS was acknowledged as a reason for use in a number of studies (Sumnall et al, 2011; Bilgri, 2016; Deligianni et al, 2017). However, although accessibility was frequently mentioned as a motivation for NPS use, it was usually

suggested in conjunction with other motivations such as legality (with which it is closely associated) as opposed to a unique motivation.

In relation to the closure of headshops through the PS Act, the professional interviewees (Study Three) highlighted the example of Ireland in terms of the closure of headshops but the unaffected levels of NPS use. Additionally, the change in mephedrone legislation had little effect on mephedrone accessibility; users previously purchasing it from headshops or the internet changed to sales being driven underground and buying from street dealers (Winstock et al, 2010a; Sande, 2015). In general, among the professionals it could be surmised that the importance of accessibility was perceived as very population dependent. For example, the previous ease of access of NPS would be likely to be more important for vulnerable user groups and younger users in comparison with older, pre-existing drug users. This was also found by Sutherland et al (2017). There were contrasting views on the importance of the online market as a whole. However, it was perceived (Studies Two and Three) that following the PS Act the darknet will become more important in accessing NPS.

Although the PS Act policymakers, through the closure of headshops, perceived accessibility as a key factor, the drug users in the CBC (Study Four) ranked 'accessibility' as the least important attribute. It is essential to note however, that the pre-existing drug users who engaged in Study Four are unlikely to be the same population who would choose to use NPS because of their previous ease of access in headshops.

Rogers' DOI appears to be appropriate in relation to NPS in that the existence of relative advantages of NPS will affect successful or unsuccessful diffusion. Although certain relative advantages could be seen to exist as secondary relative advantages, it is clear that particular relative advantages are key to an NPS diffusing. The innovation itself as a component of Rogers' DOI is an important aspect of the diffusion of an NPS.

Communication Channels

Communication must take place if an innovation is to spread beyond its inventor (Rogers, 1983) and this takes place through communication channels: the mass media and interpersonal channels. These channels are important aspects of influence of the diffusion of NPS and they are appropriate in describing NPS diffusion.

Interpersonal channel

Online Forums

Rogers emphasised the importance of interpersonal networks through describing them as the ‘heart of the diffusion process’ (1995: 34) and through describing diffusion as a highly social process. Online forums can be seen as a communication channel in that they provide platforms in which individuals can create and share information. They were seen as being an interpersonal channel for their facilitation of the diffusion of NPS. The topic of online forums has been increasingly addressed in the literature and they were seen as providing the first reports of a new drug. For example, the first user reports of SCRA were spread through online forums (Bilgrei, 2016). These reports on forums about a substance are frequently the first reports on the toxicity and effects of an NPS (Wood and Dargan, 2012). This highlights both the harm reduction aspect of the internet but also the marketing capabilities and their role of raising awareness. The role of forums in providing harm reduction advice was recognised in the critical analysis (Study One), both sets of interviews (Studies Two and Three) and the questionnaire (Study Four). In the work by McElrath and Van Hout (2011), respondents in Ireland stated that they considered the information they read on online forums and from headshop staff to be trustworthy as their priority was harm reduction and safety. This was confirmed by O’Brien et al (2014) and Matthews et al (2017) in relation to NPS.

In the questionnaire (Study Four), 42.1% of the sample used online forums. However, this figure is likely to be subject to bias as the questionnaire and CBC were advertised on online forums, among other online platforms. Among those who used forums, the highest percentages of use related to gaining information on psychopharmacological effects (53.7%) and side effects (53.2%). This also highlights the importance of these two attributes among this sample (see previous section). In terms of the influence of online forums in affecting the decision to adopt an innovation, in relation to positive discussion, the highest percentage was individuals being ‘neither likely/nor unlikely’ (31.1%) to try a product. However, the answer of being ‘moderately likely’ or ‘very likely’ had a combined percentage of 36.3%. In terms of negative discussion, the answer of being ‘neither likely/nor unlikely’ was at a much lower percentage (14.2%) and the combined percentage of

‘moderately unlikely’ or ‘very unlikely’ was at 59.5%. Bilgri (2016) stated that in their study the interviewees were also influenced by negative reports. This highlights the influence of forums especially in discouraging an individual to try a product which had negative reviews. Nevertheless, the influence of forums in relation to positive and negative discussion was significantly lower than the percentages for the influence of a friendship network (see next section). In relation to part-worth utility scores in the CBC (Study Four), for those who discussed drug use on forums, a ‘hallucinogen-like drug’ had the highest part-worth utility score and the lowest score was for a ‘cannabis-like drug’. This would suggest that the influence of forums is likely to differ between drug-using populations and their drug of choice.

The professional interviewees (Study Three) perceived that the forums had played an important role in the emergence of NPS, especially in comparison to traditional illegal drugs. They recognised, however, that their importance was likely to differ between populations and products. The interviewees perceived that the online forums definitely played a role in people choosing to adopt or not adopt a product; however quantifying the influence was difficult. An NPS product may diffuse among the online forum community; but whether this extends beyond this community was questioned by some professional interviewees. The influence of the online forums was strongly supported by the retailers (Study Two). Two retailers emphasised that forum discussions were key to people choosing a product and to them stocking a popular product and that negative reports would have a big influence on the diffusion of a product. They also recognised that the online forums had the power to shorten the diffusion process, which would usually take six to nine months, if a product had positive feedback on a forum (R2).

Bilgri (2016) highlighted the importance of exploring the relationship between discourse on drug forums and ‘real-life’ experiences of forum users and emphasised the lack of research into this area (for an exception see Murguía et al, 2007). Hunt et al (2013) suggested that the ‘perception, culture and subculture’ of drug experience through the stories shared by users had as much influence on the perceived appeal of a drug as its psychopharmacological effects. Bilgri (2016) used historical data on a Norwegian drug online forum exploring SCRA and interviews with forum members to explore the evolving discourse surrounding SCRA. In the study, forum users were tempted to use different drugs if there had been positive representations as this was a community whose opinions were perceived to be unbiased and trustworthy (Bilgri, 2016). In the study (Bilgri, 2016: 20, 22), perceptions of SCRA began as positive however as growing negative reviews and trip reports appeared and ‘online representations of the drug shifted towards descriptions of an unattractive drug’ this led to a ‘communal rejection’ by the forum members. However, forum users perceived that those having negative experiences were doing so because of their decision to use an unstable and unattractive drug.

These findings by Bilgri (2016: 22) highlighted the influence of online forums, explaining that the user trends of SCRA experienced a ‘user-driven change’: the result of anonymous discussion between forum users led to changes in the discourse surrounding SCRA use. Consequently, this was likely to dissuade other forum users from experimenting with the drugs. Additionally, the reviews that the interviewees (Bilgri, 2016) read on forums meant they had a starting point of reference of which they had no prior knowledge and therefore would be influenced by positive or negative reports.

It would appear that for the individuals using online forums that the influence of feedback posted is important in affecting which products may diffuse. Furthermore, members are likely to be influenced by trip reports on the forums, especially if they have been written by an authoritative member who can be identified as an opinion leader (explored later in this chapter). However, how often and whether this extends beyond the online forum community to the general population is unknown. Furthermore, for particular user groups, for example vulnerable populations using SCRA, they will not be influenced by discussions on online forums about a new NPS. In addition, it would have been interesting to compare the findings from Study Two to independent research undertaken to determine the importance of online forums for offline headshop owners and whether online forums played as important a role.

Friendship networks

In the critical analysis (Study One), the definition of an interpersonal channel, extended beyond friendship networks to include drug using networks and communities such as prison communities. However, with the exception of SCRA use in prisons, the majority of the focus in the interviews (Studies Two and Three) and questionnaire (Study Four) was the role and influence of friendship networks. The critical analysis concluded that interpersonal channels were more important than the mass media, in their influence as a communication channel. Although there is a perception surrounding NPS that the internet has been the key reason for their general diffusion, the role of friendship networks should not be underestimated.

In the questionnaire (Study Four), more respondents stated that they would try a product with positive feedback from friends in comparison with online forums. It was interesting that this sample, although users of online forums, still perceived that their ‘real life’ friends had more influence than the online community of which they were a part. Additionally, there was a higher percentage in relation to the influence of friendship networks relating to negative discussion, in which a combined percentage of 78.4% stated that they would be ‘very unlikely’ or ‘moderately unlikely’ to try a product. This is in comparison to 59.5% for online forums. The influence of friendship networks was frequently addressed in studies in the literature and was an important motivation or influence to use a product (Freeman et al, 2012; Gunderson et al, 2014; Deligianni et al, 2017).

There is a strong relationship between individuals using drugs having friends who also use drugs (Krohn and Thornberry, 1993). In their review, Marschall-Lévesque et al (2014: 49) explored the notion of ‘peer association’, meaning:

‘the ways by which substance using... peers are thought to influence, directly and indirectly, an adolescent’s... own substance use. This influence consists of, but is not limited to, peer pressure, perceived peer norms on substance use and/or actual peer norms on substance use’.

They found that peer association on the substance use of an individual remains supported although the level of this influence is dependent on other independent and environmental factors. Khey et al (2008) and Stogner et al (2012) found that friends played a more important role than the internet in transferring information about salvia divinorum. However, the year of these studies should be noted as the role of the internet may have become more popular in the succeeding years. Additionally, the study by Khey et al (2008) involved drug users and non-drug users and therefore the importance of the internet is likely to differ and it is perhaps unsurprising that friends played a greater role. Nevertheless, Khey et al (2014: 43) stated that research has found that friends and ‘other contacts’ are the primary providers of drug information. It was also suggested that drug experimentation, whilst not driven by intense peer pressure, was more likely through motivation of individuals wishing to connect and share experiences with peers (Khey et al, 2014).

The professionals (Study Three) spoke about friendship networks the least of all the communication channels. Nevertheless, they acknowledged that friendship networks would be important for younger people and the feedback from friends would be important in choosing a product. In the study by Barnard et al (2014), reading positive experiences about a NPS product from a friend, would in a hypothetical situation, make a pre-existing drug user ‘more likely’ to take the NPS product (Barnard et al, 2014: 58). The retailers (Study Two) addressed the role of friendship networks very minimally. One suggested that friendship networks were important previously, however now online forums were more important. Another however, recognised that word of mouth in social groups was likely to lead to an increase in use.

The role of interpersonal channels, in this case friendship networks, is an important aspect of the diffusion of an innovation, especially a drug. However, although this was apparent through the critical analysis and the questionnaire (Studies One and Four), this was less apparent in the two sets of interviews (Studies Two and Three). The reason for this is likely to be the greater focus on online forums and the media which are seen to be more associated with the emergence of NPS. Rogers (1983: 18) stated that ‘most people’ are mainly dependent on a subjective evaluation of an innovation conveyed to them from other similar individuals who have already adopted the innovation to make their decision whether to adopt. The higher percentage of individuals suggesting that their friends

would have greater influence on their decision to use an NPS product over the media and online forums (Study Four) would suggest that this is the most important communication channel in relation to NPS diffusion, despite the focus on online forums and the media more generally in the NPS literature.

Mass media channel

McAuley et al highlighted the need for NPS research to consider the role of the media in either ‘mitigating or facilitating future harm’ (2015: 466). The critical analysis (Study One) suggested that the media, in traditional terms such as newspaper reports, in relation to the diffusion of NPS, may be the least important influence among the two other communication channels. Despite this, the influence of the media is likely to have different levels of importance for different adopter categories and this was recognised by both sets of interviews (Studies Two and Three).

In the questionnaire (Study Four), respondents were asked about the influence of the media on them in reporting harmful outcomes and general discussion. Overall, it appeared that participants were ambivalent to the media. In terms of general discussion, 69.5% of the respondents stated that they would be ‘neither likely nor unlikely’ to try a product if there was general discussion of it in the media. In relation to the reporting of harmful outcomes, 45.8% stated that they would be ‘neither likely nor unlikely’ to try the product and the same percentage combined stated that they would be ‘moderately unlikely’ or ‘very unlikely’. The sample for this questionnaire would not be the group who was likely to be most influenced by the media (first-time users or younger individuals) as they were pre-existing drug users and almost half of the sample used online forums. Additionally, in relation to harms reported by the media, the retailers (Study Two) suggested that pre-existing drug users would be able to separate themselves from negative stories and this idea was also raised by the professional interviewees (Study Three).

The professionals (Study Three) perceived the media as having varying levels of influence for different groups; for example, individuals who had been introduced to the notion of NPS for the first time but also individuals who would become aware of the high strength of particular products. The ‘never-takers’ in the study by Barnard et al (2014) stated that they would be strongly discouraged from ever trying NPS if they had read negative media reports linked to deaths associated with NPS use. It is unknown whether this equated to ‘never-users’ not trying NPS because of the media reports or whether the reports strengthened their pre-existing commitment to not use NPS. Conversely, the drug users in the study by Van Hout and Brennan (2011) perceived the media reporting of NPS and traditional illegal drug related deaths as provoking ‘mild discomfort’ but not affecting either form of

drug taking. This was due to the participants perceiving media reports as sensationalist and the rarity of harmful experiences reported were in contrast to their own positive experiences.

Lancaster (2011: 399) explained that the media frame stories relating to drugs as a 'problem' where the participants are divided into 'villain' and 'victim' roles. This has an effect on non-drug users who are likely to shape their perceptions of drug use and risk from the media (Gelders et al, 2009). Therefore the findings of Study Four are likely to have been different had the research involved exploring the views of non-drug users. Whilst existing drug users may separate their own experiences from media reports, non-drug users may not make this separation and therefore stories reporting harmful effects associated with an NPS product may have a greater influence.

The media can be seen to create initial awareness of the existence of NPS for certain groups and their reporting may influence what individuals think about them through how the media frames the issue. Consequently, this is likely to influence the policy agenda set by the government and policymakers. Lancaster et al (2011: 399) stated that the more strongly that the media 'push an issue' the more likely this will have affect politicians and policymakers to act. Additionally, Miller et al (2014) stated that policymakers are influenced more by high profile events and the media than scientific and empirical evaluations of the effects of NPS. The 'politically charged atmosphere' in which drug policy takes place, especially in the UK, (Monaghan, 2014: 1025) was recognised by the interviewees (Study Three).

The retailers (Study Two) all stated that they perceived that the media had played a large role in raising awareness of NPS and this had helped the market grow. They perceived that media coverage of a particular product would increase the popularity of a product in the short term as it highlighted the efficacy of the product. However in the long term, this may lead to a 'moral panic' and legislative action which therefore affects diffusion. Dabrowska and Bujalski argued that the media played a 'major role' in the creation of the NPS 'problem' through selecting which products were moral panic 'candidates' (2013: 36). Bright et al (2012: 233) suggested that moral panics surrounding NPS are 'unhelpful' as they take the focus away from other public health concerns. In the case of synthetic cathinones, sensationalised newspaper reporting of use being associated with deviant, aggressive or bizarre behaviour created a moral panic, especially in the USA where synthetic cathinone use is still low (Stogner and Miller, 2013; Khey et al, 2014; Miller et al, 2014). Although sensationalised accounts of synthetic cathinone use resulting in a cannibalistic attack have been discredited, the association remains for 'many Americans' (Khey et al, 2014: 2) and this can be a barrier for the diffusion of an NPS. A moral panic can also be seen in April 2011 when the media began reporting the use of 'Kronic', a SCRA, in Western Australia to evade drug detection; the media reporting intensified and two months later the government in West Australia had begun legislative action to control seven SCRA (Bright et al, 2013).

One of the retailers (Study Two) suggested that if a product was mentioned by name then it was likely that an individual would search for the product by name on their website and it would be chosen over similar products. Similarly, when SCRA use began increasing in Australia, the name 'Kronic' was more frequently searched than 'synthetic cannabis'; the media were 'branding synthetic cannabis' (Brandt, 2013: 234). Forsyth (2012) also found an increase in the interest of a drug (mephedrone in the UK) through online searches following media reports of harm relating to the substance. A number of the interviewed professionals (Study Three) referenced this Google Analytics report. Some of the interviewees perceived that the media had acted as an NPS advertisement through explaining where individuals could purchase the products and their previous legal status. However, while there was a consensus that the media had raised awareness of NPS products, the extent to which this had led to actual adoption was questioned. Nevertheless, one of the government health department representatives and Australian representative both stated that there was currently action being undertaken to address the challenge of unintentional media advertising of NPS and other drugs.

The influence of the mass media in the diffusion of NPS was questioned. It was generally agreed that it played a crucial role in initial awareness of NPS, but the extent to which a product may diffuse because of reporting in the media, in lieu of recommendations from friendship networks, online forums or other interpersonal channels, is unlikely.

Homophily and Heterophily

The extent to which a social system has homophily or heterophily is also an aspect of the communication channels component of Rogers' theory. Homophily is the extent to which individuals who interact are similar in certain attributes such as beliefs, education and social status. Drug users as a whole appear to be a homophilous group however, the social system should be seen as more heterophilous because of the different drug categories and motivations for use. In Study Two, the retailers distinguished between 'legal high' and 'research chemical' users which highlights the heterophily of this social system. In addition, the professionals (Study Three) emphasised the need to distinguish between different NPS users. The heterophily of drug users could be highlighted in Study Four where there was a disparity between the different Latent Classes identified and their preferences for different attributes. Acknowledging the homophily and heterophily of the social system of NPS users is an important consideration in exploring the diffusion of NPS.

In conclusion, the communication channels aspect of Rogers' theory appears applicable to explaining the diffusion of NPS. In terms of the general population, friendship networks are still likely to be the most important communication channel in affecting the diffusion of NPS. However, online forums

are emerging as an important channel and will have increased importance for forum members. The media can increase awareness of a product but the extent to which it will influence the successful widespread diffusion of a product without additional influence from other communication channels or relative advantages is unlikely.

Time

The time aspect of Rogers' theory related to the relative time it took adopter categories to adopt an innovation. These adopter categories are innovators, early adopters, early majority, late majority and laggards. The applicability of these adopter categories for the different user groups was the most difficult to apply to the diffusion of NPS (see the beginning of this chapter) and therefore possibly the least applicable aspect of Rogers' theory to the diffusion of NPS.

NPS user groups

NPS user groups in general identified in the critical analysis (Study One) included pre-existing drug users, students, prisoners, clubbers and injecting drug users. All these groups were referenced by the interviewees (Studies Two and Three). Additionally, the critical analysis recognised the majority of NPS users as being male and this was a finding in the questionnaire (Study Four) and by one of the retailers (Study Two). SCRA users were perceived as being atypical to other NPS users and this was acknowledged in the interviews. The retailers and professionals interviewed highlighted that there were a variety of NPS users and their choice of product will reflect differing motivations for use. The professionals (Study Three) were not asked questions directly about Rogers' adopter categories however, their answers relating to NPS users could still be applied to the theory.

Innovators

In the critical analysis (Study One), innovators were seen to represent 'psychonauts' and this was the most appropriate application of any adopter category to any NPS user group. Psychonauts were recognised as a user group by the professionals (Study Three) who characterised them by their knowledge and risk taking behaviour and were thought to be an older but smaller group. One of the retailers interviewed (Study Two) could be identified as an innovator in that they had a background in pharmacology and their expert knowledge which is associated with innovators. Another retailer suggested that their wholesalers could be seen as innovators. In the questionnaire and CBC (Study Four), the 'balanced effects' Class could be seen to represent the innovators group, however, this Class is likely to include early adopter and early majority members. The characteristics of this Class included high levels of harm reduction practice, which is in keeping with characteristics shown by innovators, but high use of online forums, which would suggest the presence of opinion leaders in this Class which are likely to be found in the early adopters group. The Class also had high levels of influence from the online forums, which would suggest early majority characteristics. This Class had the highest level of preference for 'hallucinogen-like drug' which is applicable to innovators. This

Class was the largest Class and therefore it is unsurprising that there is likely to be individuals belonging to different adopter categories.

Early adopters

Early adopters are the most influential adopter category. Their advice is often the most trusted and they are seen as leaders, and so opinion leaders are frequently found in this category. In the critical analysis (Study One), early adopters were identified as forum moderators, administrators or experienced forum users. Offline early adopters were considered to be clubbers. In the professional interviews (Study Three), clubbers were identified as an NPS user group. However, their existence as early adopters is likely to extend only for users of synthetic cathinones as opposed to all NPS. One of the retailers (Study Two) perceived that certain customers could be early adopters in that they would be asked to test products which would suggest their role as leaders.

Early majority

The early majority group were seen to comprise pre-existing drug users who use online forums but they may not contribute to the forums but read entries instead (Study One). There were different perceptions among the retailers (Study Two) relating to which adopter category their customers represented. One retailer perceived that their customers could be the early or late majority in their position of purchasing products from a clearnet online retailer; the other retailers identified their customers as belonging to other groups. Younger users were identified as a separate NPS user group (Study Three) and this could be seen to be applicable to the early majority in their use of online forums and the influence of their friends.

Late majority

The late majority category is similar to the early majority in many characteristics (Study One) although individuals in this adopter category may not use online forums or interact with the mass media; they form most of their ideas from friendship networks (Rogers, 1983). They are likely to be represented by vulnerable groups who will adopt an innovation late and through economic pressure (Rogers, 2003). This group could also represent individuals who are using NPS but are unaware and not concerned that they are doing so. For example, individuals unintentionally using NPS or using generic white powders. This group of individuals may also be applicable to the laggard adopter category. The use of NPS in an unintentional (mistaking the substances for traditional illegal drugs)

and a problematic (such as addiction) capacity was recognised as a form of NPS use in the study by Soussan et al (2018).

Two of the retailers (Study Two) perceived that their customers may belong to the late majority adopter category along with either the early majority or laggards categories. One of the retailers suggested that their belonging in this category related to their non-purchasing of NPS from original stockists but from their clearnet sites. However, this practice is also likely to extend to adopter categories earlier in the innovation adoption process. The categories of the late majority and laggards were more difficult to identify in the interviews with the professionals (Study Three).

Laggards

Laggards are the last adopter category to adopt an innovation. This group are also likely to be represented by vulnerable NPS user groups as they have the lowest socio-economic status and they are the most price-sensitive of all the adopter categories (Study One). They are less likely to be influenced by the most popular communication channels because they do not use online forums. One retailer (Study Two) perceived that the majority of their customers would be the late majority or laggards. The same retailer stated that their customers may belong to the laggard adopter category because they heard about products from the media. Laggards could include problematic NPS users, prisoners and vulnerable groups (Study Three) and therefore are unlikely to purchase from clearnet retailers. Instead, these groups would be likely to obtain NPS, in particular SCRA, from street dealers or social offline networks. These individuals are likely to have low socio-economic status and will not be influenced from communication channels which is likely to apply to the user groups identified in Study Three.

The 'minimal side effects' Class (Study Four) could be identified as laggard, or late majority, members. This is perceived through this Class having the least interest in NPS, which may suggest that they will only adopt an NPS if they have to, for example if there is low availability of traditional illegal drugs. Additionally, this Class had the highest percentage of use across the Classes for the use of clearnet websites to source their drugs and this is the perception of the retailer who stated that their customers were likely to be laggards (Study Two). The Class as a whole however, had low levels of use of the internet for sourcing drugs or drug information. The 'price sensitive' Class could also be seen to represent the laggard category. This is because of their characteristics of being the most price sensitive adopter category. Furthermore, this Class was the least influenced by online forums and had the lowest level percentage importance attached to 'side effects'.

Categories of user groups identified in the literature

Alternative NPS user groups have been identified in the literature. Werse and Morgenstern (2012) identified five distinct NPS user groups: ‘Experimental users’, ‘Substitutors’, ‘Potheads 2.0’, ‘Specialist psychonauts’ and ‘Omnivores’. ‘Experimental users’ are individuals who have experimented with NPS who have previous experience of drug use and also individuals without previous experience. ‘Substitutors’ are individuals who have replaced traditional illegal drugs with NPS for legal reasons, most commonly SCRA for cannabis. ‘Potheads 2.0’ are individuals who use SCRA and cannabis interchangeably in terms of availability, although Werse and Morgenstern (2012) argued that this group may no longer be as prominent due to the nature of the internet providing greater availability. ‘Specialist psychonauts’ have characteristics similar to psychonauts in having a specific interest in research chemicals and the ‘will to expand their drug experience is often the main motivation for use’ (Werse and Morgenstern, 2012: 228). This group appears to be innovators. ‘Omnivores’ can be seen to be opportunistic NPS users who will use ‘virtually all kinds of drugs’ depending on availability or setting (Werse and Morgenstern, 2012: 228). This group could possibly be applied to the late majority or laggards.

The National Assembly for Wales Health and Social Care Committee (2015) also recognised three NPS user groups: ‘recreational and club/party goers’, ‘psychonauts’ and ‘poly-drug users’. ‘Recreational and club/party goers’ can be described as young adults who ‘tend to binge use on weekends’ using a number of substances (National Assembly for Wales Health and Social Care Committee, 2015: 23). This group could be seen to represent early adopters or the early majority. ‘Psychonauts’ have similar characteristics as traditional psychonauts and therefore can be identified as innovators: they are individuals who ‘actively experiment with mind altering chemicals’ and entirely new substances (National Assembly for Wales Health and Social Care Committee, 2015: 24). ‘Poly-drug users’ are individuals who are previous drug-users and will ‘add NPS to their repertoire of drugs they use’; this group will include problematic injecting drug users (National Assembly for Wales Health and Social Care Committee, 2015: 24). This group could be seen to have similar characteristics as the late majority and laggards.

The aspect of time in the DOI is a strength in that in other behavioural science research the dimension of time is ‘simply ignored’ (Rogers, 1983). However, with the exception of innovators, who were a clear NPS user group, applying the other categories to NPS user groups was challenging. It may be the case that the adopter categories are appropriate to the diffusion of NPS however, the challenge of identifying the different NPS user groups may be the reason for this difficulty in applying user groups to Rogers’ theory.

Social System

The social system is the network of individuals with shared social norms. The focus of this thesis for this component was the role or existence of opinion leaders and change agents. These two adopter groups were acknowledged in relation to the diffusion of NPS, but they were not seen to be as important to the diffusion of NPS as other aspects of Rogers' theory.

Opinion leaders

Opinion leaders have the greatest influence on other individuals within the social system in advocating and stimulating the diffusion of innovations. In the NPS market, opinion leaders are likely to be forum moderators or at least active participants in online forums (Study One). Opinion leaders would lose their credibility if they were perceived as too closely representing change agents (Rogers, 1983). In the interviews, both the retailers and professionals (Studies Two and Three) recognised the existence of opinion leaders in the environment of online forums. The retailers (Study Two) perceived that opinion leaders could be identified by their length of time as a member and the number of forum posts. They also characterised them as being very knowledgeable. Similarly, the professionals (Study Three) who acknowledged the existence of opinion leaders defined them as having high levels of experience and their existence depended on the nature of their forum posts which needed to convey their knowledge and experiences; they needed to have the right reputation to be recognised as an opinion leader.

Change agents

In the critical analysis (Study One), change agents were recognised as likely to be retailers who promote particular NPS as they will have high levels of NPS knowledge. The retailers (Study Two) who were interviewed were asked about the existence of change agents and they stated that they had not used them to promote their products. They did not reveal however, whether they themselves were change agents. However, during the professional interviews (Study Three) two interviewees suggested the existence of change agents employed by online retailers to promote products. One interviewee (Study Three) stated that the existence of change agents had become more difficult to identify on drug forums as anything identified as promotional activity would be removed by the moderators. The same interviewee suggested however, that change agents may become more prominent in cryptomarkets where there is a greater focus on profit as opposed to harm reduction.

In conclusion, in the social system of NPS users there does appear to be the existence of opinion leaders, and to a lesser extent, change agents. There was a strong focus on the existence of opinion leaders in online forums and therefore their existence in this social system beyond this environment is unknown. However, in friendship networks they are likely to represent particularly influential and knowledgeable friends. The area of studying how the social or communication structure of a system affects the diffusion of an innovation is limited in comparison to other areas of diffusion research. Rogers (1983) suggested that the reason for this is the difficulty in separating the effects of the structure of the social system from the characteristics of the individuals within the social system.

The applicability of the Diffusion of Innovations theory to understanding NPS

Innovation Itself

The first aspect of Rogers' theory, the innovation itself is especially applicable to the diffusion of NPS. NPS products which also offer relative advantages, for example in price, low chance of negative side effects and the desired psychopharmacological effects will preferentially diffuse at a faster rate and more successfully. Other attributes of the innovation are less important but may still contribute to the likelihood of diffusion. For example, if an NPS product is complex to use, or requires preparation before consumption then use is unlikely to diffuse beyond innovators.

Communication Channels

Although the mass media may generate product awareness for some user groups, interpersonal channels of friendship networks and online forums play a more important role in diffusion. However, it may be beneficial to update the DOI to adapt to the changes that the internet has made in communication. Rogers addressed the impact of the internet in the fifth edition of his book (Rogers, 2003) through acknowledging that there had been changes to the way in which we communicate since the original DOI (Rogers, 1962). However, although he asked the question as to whether the internet should be a mass media or interpersonal communication channel, he did not discuss the answer to this question. It would appear from this research that the internet exists as both communication channels. The importance of the internet has seen mass development since 2003. This not only relates to communication in terms of communication channels but also the extensive development of online retail, which in itself includes social communication. It would be important to explore the extent to which this has affected the diffusion of innovations. This is especially in terms of communication channels, both interpersonal and mass media, but also in terms of observability, the different adopter categories, in particular early adopters who are the most influential group, and also how the role of opinion leaders and change agents would be affected by the widespread internet use.

Time

This thesis focused on the time dimension of the different adopter categories. This aspect of Rogers' theory was perhaps the most difficult to effectively apply to the diffusion of NPS. Whilst the innovator category could clearly be identified as the psychonaut user group, the other four categories were harder to identify. This may be a consequence of attempting to apply the theory to NPS user

groups as a whole as opposed to identifying the various adopter categories as different user groups of different NPS categories such as SCRA user groups or synthetic cathinone user groups.

Social System

The role of opinion leaders and change agents was deemed as the most appropriate aspect to the diffusion of NPS and their existence was seen as applicable to NPS diffusion. This was especially prominent in online forums where the influence of opinion leaders was seen to play a role in the diffusion of an NPS, although this may extend only to the online community. The identification of change agents was more difficult; however the theory is still applicable to the diffusion of NPS in relation to the social system.

A criticism of Rogers' theory could be its failure to consider external factors, beyond the innovation itself. In relation to the diffusion of NPS, this would be applicable to the influence of external trends which affect the popularity of a NPS product. The influence of wider external factors is important to acknowledge as affecting the diffusion of NPS and drug use in general. For example, geographical location of a country (Sande, 2015) or youth and cultural trends (Wilkins and Sweetsur, 2013). Wider trends were recognised as a reason for diffusion in the interviews with professionals (Study Three) in relation to certain NPS becoming a trend but then going out of fashion. Furthermore, the impact of drug legislation and social norms also need to be recognised as playing roles. Additionally, one of the reasons given to the popularity of W18, a synthetic opiate, relates to overprescribing and this adds a new dimension in that diffusion is profession led rather than through user demand. This would suggest that the theory needs updating to be adequately applied to drug use.

The communication channels as an attribute also should be updated to address the changes that the internet has made to the methods in which individuals communicate. For example, it is difficult to assign online forums, blogs and independent drug information sites to Rogers' communication channels. A challenge in general in relation to diffusion is the extent to which diffusion can be measured and the influence of different attributes of Rogers' theory. Owing to the different user groups associated with drug use, it is difficult to ascertain what constitutes successful diffusion of an NPS product. Rogers (2003) acknowledged that the diffusion and adoption of all innovations is not necessarily desirable, and this is relevant in relation to different NPS user groups. The same innovation, for example a SCRA product, may be desirable for one adopter in one context but undesirable for another adopter, for example a synthetic cathinone user in a different context.

Strengths and novelty of PhD

The original contribution to knowledge of this PhD thesis emerges from the adoption of a theory driven perspective of the diffusion of NPS, and in particular the implementation of a social sciences theory to explore the diffusion of drug use. This distinguishes it from other studies which have used epidemiological theories. This approach allowed for a focus on the NPS market and how it is shaped and characterised.

A strength of this thesis has been the wide range of study designs and perspectives relating to the diffusion of NPS. Three stakeholder groups were included (retailers, professionals and drug users) (Studies Two, Three and Four) and both interview and empirical work was based on a theoretical perspective (Study One). The interviews with NPS retailers provided the perspectives of a stakeholder group who are frequently ignored in drug research. Additionally, the sampling frame implemented in Study Three included a broad variety of occupations/disciplines and levels of seniority which allowed for an even greater number of perspectives around the diffusion of NPS.

The time period in which this thesis was undertaken can be seen to be an additional strength. The research began in February 2015 and the time frame included the introduction of the PS Act in May 2016. The majority of interviews took place during the transition of the NPS market from quasi-legal to illegal and the analysis yielded important research questions which could be useful in assessing the impact of the Act.

The CBC (Study Four) is, to the best of the researcher's understanding, the first to use this approach to help understand drug choices. It provided an interesting extension to the more traditional quantitative or qualitative methods used in drug research.

Recommendations for future research

The use of a CBC (Study Four) to examine motivations for drug decision making offered a novel means in which to examine behaviour of drug users. Therefore, for future research it may be beneficial to conduct another CBC, or alternative CA form, but to include different attributes. These could include the importance of the lack of detection in drug testing which NPS offer, the importance of recommendations from friends, the importance of positive feedback regarding a drug on online forums or the importance of legal status as attributes. Additionally, it may be beneficial to have participants choose between 'NPS' or 'traditional illegal drugs' as options. Furthermore, as recognised by Scherer et al (2017) in their study, it may be beneficial to conduct the same CBC in another country to compare the results.

The sample used in this questionnaire and CBC was pre-existing drug users. The findings relating to preferential attributes may have been different if the sample involved a contrasting population; for example specifically NPS users or a non-drug user sample. It would have been interesting to conduct the questionnaire and CBC with these three different populations and compare the results. This research involved a particular group of drug users: individuals with access to the internet, students of the university and online forum users. Therefore, future research which involves a different user group would be beneficial. For example, conducting a CBC with vulnerable user populations such as prisoners or the homeless population. Conducting a CBC through paper forms of CBC may be more viable; and although recruitment would be a challenge, it may be possible through a service working with these groups. It would be interesting to discover the importance of drug decision making of different attributes for these populations and how they would differ to the findings of this thesis. It would be probable that different attributes would be more appropriate, for example lack of detection through traditional drug tests or price.

Future research could also be undertaken involving interviews with NPS retailers in different countries, where NPS still have legal status, to compare the findings found in this thesis (Study Two). This could also be extended to the interviews of the professionals (Study Three), although international perspectives were included in this thesis. With the introduction of the Act, it is likely that cryptomarkets will have increasing importance in the diffusion of different NPS. Therefore it may be beneficial to conduct interviews with cryptomarket retailers to understand their perceptions regarding diffusion and how these compare with the perceptions held by the clearnet retailers interviewed in this PhD. It would also be beneficial to undertake research in the future exploring the effects of the PS Act on NPS diffusion and use, to compare with the findings of this research which hypothesised about the possible effects of the Act.

Although Rogers' theory was an appropriate theory in explaining the diffusion of NPS, it may be beneficial for future research to undertake a critical analysis with regard to an alternative theory explaining the diffusion of NPS. For example, the 'trend theory' developed by Agar and Reisinger (2001) or the innovation theory of Johnston (1991). This would also be useful to undertake in relation to the impacts of the PS Act in the UK and the role of the internet. Alternatively, research could be conducted which focused specifically on a single aspect of Rogers' theory. For example, this thesis failed to explore the role of opinion leaders beyond their roles in online forums therefore research could explore the profile of opinion leaders in different networks, in particular in friendship networks.

Reflection and Limitations

The findings of this thesis cannot be generalised to all NPS users or generalised to all NPS stakeholders in the UK or NPS retailers. It may have been beneficial to have a larger number of participants in the retailers' study, although as discussed, recruitment was difficult as interviews took place when it was apparent that the PS Act would shortly be introduced. Additionally, in Study Four, the sample mainly comprised men. This is not unusual as online forums are used more by men than women and therefore the recruitment method can be seen as biased. Nevertheless, the findings of the study may have had different findings had the composition of the sample been different.

For Study Two, the composition of the sample needs to be acknowledged. The interviewed retailers framed themselves as 'responsible' retailers and therefore 'irresponsible' retailers were not interviewed and this may have offered a different perspective. On reflection, it is perhaps noticeable that only self-labelled responsible retailers wished to be involved in the research. The volunteering of responsible retailers for research was similarly acknowledged by the New Psychoactive Substances Review Expert Panel (2014) when they explored and provided recommendations on NPS legislative responses to the government. Furthermore, in this study it should be emphasised that the views only related to a small number of online retailers and headshop retailers may have offered a different perspective on NPS diffusion.

Soussan et al (2018: 71) explained that scientific and in-depth knowledge about NPS motivations use are scarce and additionally that they were 'poorly described reasons deduced from top-down approaches'. Therefore the aim of their study was to incorporate a more inductive approach and concentrate on users' self-reported reasons. The use of a top-down approach could be seen as a limitation of this thesis. The interaction with users (Study Four) involved pre-determined attributes for motivations for drug use and therefore did not allow for inductive answers. However, questions were asked in the interviews (Studies Two and Three) on perceptions of motivations for use and this allowed for a more inductive approach.

There is a suggestion that there is too much of a focus by researchers on the total number of non-respondents in contrast to *who* the non-respondents were (Goldstein, 2002). For example, in Study Three it was noticeable that the individuals who did not respond to recruitment emails were civil servants currently involved in the development of drug policy, in contrast to an individual who previously held a similar position who did agree to be interviewed. These individuals who were contacted did not decline an interview; they did not reply to the original recruitment email. This may have been because of schedules which did not allow for an interview or because of a lack of interest in taking part in the interview due to the nature of the research. A current Home Office perspective would have added an interesting dimension to the perception of the PS Act as a large proportion of interviewees viewed the Act negatively.

The two police representatives who were interviewed offered contrasting perspectives and therefore it would have been interesting to interview a third police representative perhaps with a more intermediate level of experience. It may be the case that individuals in higher positions would be more likely to communicate the official line of the organisation. Contrastingly, individuals in more junior positions, who for this research were implementing the Act at a ground level, may be more willing to voice a different opinion on the Act and its effectiveness. Furthermore, in the composition of the sample it is noticeable that individuals who may have had greater support of the PS Act, such as an individual from an anti-drugs think tank, were not included in the sample. The interviews took place in the 2016 and it may be the case that interviewed individuals have since changed their perspectives however this cannot be established.

Although interviews were conducted with representatives from countries where similar legislation had been introduced, it may have been beneficial to speak to a number of individuals from each country to contrast different views. It may have also been beneficial to interview individuals from countries where the decision had been made *not* to introduce blanket bans. However, this would have increased the sample size substantially and made thematic convergence more difficult. Nevertheless, initial contact was created with a representative from Ireland however, this interview did not take place. This is a notable absence because of the importance of the Irish Psychoactive Substances Act in relation to the PS Act. It would have been beneficial to interview an individual who could have provided an insight into their perceptions of both Acts.

Conclusion

In conclusion, although a theory such as Rogers' DOI can be used to understand the emergence and popularity of NPS, this needs to be applied on a substance-by-substance basis because of contextual factors which affect the diffusion of different NPS. Population heterophily needs to be acknowledged, as different relative advantages, communication channels and levels of influence from opinion leaders or change agents affect different NPS user groups.

The DOI can be used to explain the emergence and popularity of different NPS and therefore it could be used for other drugs more generally. However, drugs do not exist as conventional commodities in a market and therefore external factors which affect the spread of drug use, such as wider trends or legislation, also need to be acknowledged. The UK PS Act will have an effect on the diffusion of NPS and therefore the changes in health and social harms associated with individuals choosing to access NPS through the underground market or choosing to use traditional illegal drugs need to be acknowledged. Furthermore, the different user groups identified through the DOI will need support in different forms and this should be recognised when identifying appropriate intervention needs.

Finally, this thesis has highlighted the importance of engaging and conducting research with a range of stakeholders in order to obtain a greater understanding of drug use motivation to assist with public health interventions.

References

- Abdulahim, D. and Bowden-Jones, O. on behalf of the NEPTUNE Expert Group (2015) *Guidance on the Management of Acute and Chronic Harms of Club Drugs and Novel Psychoactive Substances*, Novel Psychoactive Treatment UK Network (NEPTUNE), London.
- Abraham, C. and Hayward, G. (1985) 'Towards a microscopic analysis of industrial innovations: from diffusion curves to technological integration through participative management', *Technovation*, 3, 3-17.
- ACMD (2015) 'Psychoactive Substances Bill', in a letter to Theresa May, 2nd July 2015. Accessed January 2016. Available at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/441400/2-7-15-_ACMD_advice_on_PS_Bill.pdf
- Addison, M., Stockdale, K., McGovern, R., McGovern, W., McKinnon, I., Crowe, L., Hogan, L. and Kaner, E. (2017) 'Exploring the intersections between novel psychoactive substances (NPS) and other substance use in a police custody suite setting in the north east of England', *Drugs: Education, Prevention and Policy*.
- Adler, P. A. and Adler. P. (1994) 'Observational Techniques'. In N. K. Denzin and Y. S. Lincoln, (Eds.) *Handbook of Qualitative Research*. Sage Publications: Thousand Oaks, CA, pp. 377-393.
- Agar, M. (2003) 'Toward a qualitative epidemiology', *Qualitative Health Research*, 13, (7): 974–986.
- Agar, M. and Reisinger, H. S. (2001) 'Using trend theory to explain heroin use trends', *Journal of Psychoactive Drugs*, 33, (3): 203–211.
- Agar, M. and Reisinger, H. S. (2003) 'Going for the global: The case of ecstasy', *Human Organization*, 62, (1): 1–11.
- Agar, M. and Reisinger, H. S. (2004) 'Ecstasy: Commodity or Psychoactive Drugs', *Journal of Psychoactive Drugs*, 36, (2): 253–264.
- Agar, M. and Wilson, D. (2002) 'Drugmart: Heroin epidemics as complex adaptive systems', *Complexity*, 7, (5): 44–52.
- Agarwal, B. (1983) 'Diffusion of Rural Innovations: Some Analytical Issues and the Case of Wood-burning Stoves', *World Development*, 11, (4): 359-376.
- Aizstrauta, D., Ginters, E. and Eroles, M-A. P. (2015) 'Applying Theory of Diffusion of Innovations to Evaluate Technology Acceptance and Sustainability', *Procedia Computer Science*, 43, 69-77.

- Aldridge, J. A. and Askew, R. (2017) 'Delivery dilemmas: How drug cryptomarket users identify and seek to reduce their risk of detection by law enforcement', *International Journal of Drug Policy*, 41, 101–109.
- Aldridge, J. A. and Décary-Héту, D. (2016) 'Hidden Wholesale: The drug diffusing capacity of online drug cryptomarkets', *International Journal of Drug Policy*, 35, 7-15.
- Allmark, P. J., Boote, J., Chambers, E., Clarke, A., McDonnell, A., Thompson, A. and Tod, A. (2009) 'Ethical issues in the use of in-depth interviews: literature review and discussion', *Research ethics review*, 5, (2): 48-54.
- Andersson, M. and Kjellgren, A. (2016) 'Aspects of Substance Displacement - From Illicit Drugs to Novel Psychoactive Substances', *Journal of Addiction Research & Therapy*, 7, (3): 1-3.
- Andrews, D., Nonnecke, B. and Preece, J. (2003) 'Electronic Survey Methodology: A Case Study in Reaching Hard-to-Involve Internet Users', *International Journal of Human-Computer Interaction*, 16, (2): 185-210.
- Ansari, S. J., Fiss, P. and Zajac, E. J. (2010) 'Made to Fit: How Practices Vary as They Diffuse', *Academy of Management Review*, 35, 67-92.
- Arfken, C. L., Madeja, C. and Owens, D. (2014) 'Comparison of synthetic substances: Diffusion of innovation framework', *Journal of Psychoactive Drugs*, 46, (5): 362-8.
- Arnold, C. (2013) 'The new danger of synthetic drugs', *The Lancet*, 382, 15-16.
- Aromatario, M., Bottoni, E., Santoni, M. and Ciallella, C. (2012) 'New "Lethal highs": A case of a deadly cocktail of GHB and Mephedrone', *Forensic Science International*, 223, e38–e41.
- Arts, J. W. C., Frambach, R. T. and Bijmolt, T. H. A. (2011) 'Generalizations on consumer innovation adoption: A meta-analysis on drivers of intention and behaviour', *International Journal of Research in Marketing*, 28, (2): 134-144.
- Atkin, T., Garcia, R. and Lockshin, L. (2006) 'A Multinational Study of the Diffusion of a Discontinuous Innovation', *Australasian Marketing Journal*, 14, (2): 17-33.
- Atkinson, A. M., Begley, E. and Sumnall, H. R. (2016) *Health responses to NPS*, EMCDDA: Lisbon.
- Ayres, T. C. and Bond, J. W. (2012) 'A chemical analysis examining the pharmacology of novel psychoactive substances freely available over the internet and their impact on public (ill) health. Legal highs or illegal highs?', *BMJ Open*, 2, (4): 1-8.
- Baek, H., Oh, S., Yang, H-D. and Ahn, J. (2016) 'Electronic word-of-mouth, box office revenue and social media', *Electronic Commerce Research and Applications*, 1-25.

- Barnard, M., Russell, C. and McKeganey, N. (2014) *The Use and Responses to 'Legal Highs'/Novel Psychoactive Substances: A Needs Assessment for Buckinghamshire County Council*, Centre for Drug Misuse Research.
- Barnard, M., Russell, C., McKeganey, N. and Hamilton-Barclay, T. (2017) 'The highs and lows of NPS/"Legal High" use: Qualitative views from a UK online survey', *Drugs: Education, Prevention and Policy*, 24, (1): 96-102.
- Barratt, M. J., Cakic, V. and Lenton, S. (2013) 'Patterns of synthetic cannabinoid use in Australia', *Drug and Alcohol review*, 32, (2): 141-6.
- Barratt, M. J., Seear, K. and Lancaster, K. (2017) 'A critical examination of the definition of 'psychoactive effect' in Australian drug legislation', *International Journal of Drug Policy*, 40, 16-25.
- Barrette, C. M. (2015) 'Usefulness of technology adoption research in introducing an online workbook', *System*, 49, 133-144.
- Bauer, D. J. and Curran, P. J. (2003) 'Distributional assumptions of growth mixture models: implications for overextraction of latent trajectory classes', *Psychology Methods*, 8, (3): 338-363.
- Baumeister, D., Tojo, L. M. and Tracy, D. K. (2015) 'Legal highs: staying on top of the flood of novel psychoactive substances', *Therapeutic Advances in Psychopharmacology*, 5, (2): 97-132.
- Becker, M. H. (1970) 'Sociometric Location and Innovativeness: Reformulation and Extension of the Diffusion Model', *American Sociological Review*, 35, (2): 267-282.
- Beharry, S. and Gibbons, S. (2016) 'An overview of emerging and new psychoactive substances in the United Kingdom', *Forensic Science International*, 267, 25-34.
- Bennett, J. and Bennett, L. (2003) 'A review of factors that influence the diffusion of innovation when structuring a faculty training program', *Internet and Higher Education*, 6, 53-63.
- Berry, J. M. (2002) 'Validity and Reliability Issues in Elite Interviewing', *Political Science and Politics*, 35, (4): 679-682.
- Bertol, E., Vaiano, F., DiMilia, M. G. and Mari, F. (2015) 'In vivo detection of the new psychoactive substance AM-694 and its metabolites', *Forensic Science International*, 256, 21-27.
- Bertrand, J. T. (2004) 'Diffusion of innovations and HIV/AIDS', *Journal of health communication*, 9, 113-21.

- Bickel, W. K., Miller, M. L., Yi, R. Kowal, B. P. Lindquist, D. M. and Pitcock, J. A. (2007) 'Behavioral and Neuroeconomics of Drug Addiction: Competing Neural Systems and Temporal Discounting Processes', *Drug and Alcohol dependence*, 90, (1): S85-S91.
- Bilgri, O. R. (2016) 'From "herbal highs" to the "heroin of cannabis": Exploring the evolving discourse on synthetic cannabinoid use in a Norwegian Internet drug forum', *International Journal of Drug Policy*, 29, 1-8.
- Blackman, S. and Bradley, R. (2016) 'From niche to stigma—Headshops to prison: Exploring the rise and fall of synthetic cannabinoid use among young adults', *International Journal of Drug Policy*, 1-8.
- Bloomberg, L. D. and Volpe, M. (2016) *Completing your Qualitative Dissertation*, Third Edition, Sage Publications: Los Angeles.
- Bonar, E. E., Ashrafioun, L. and Ilgen, M. A. (2014) 'Synthetic cannabinoid use among patients in residential substance use disorder treatment: Prevalence, motives, and correlates', *Drug and Alcohol Dependence*, 143, 268-271.
- Boyd, D. M. and Ellison, N. B. (2007) 'Social network sites definition, history, and scholarship', *Journal of Computer-Mediated Communication*, 13, (1): 210-230.
- Boyer, E. W., Lapen, P. T., Macalino, G. and Hibberd, P. L. (2007) 'Dissemination of psychoactive substance information by innovative drug users', *Cyberpsychology and Behaviour*, 10, (1): 1-6.
- Boys, A., Marsden, J. and Strang, J. (2001) 'Understanding reasons for drug use amongst young people: a functional perspective', *Health Education Research Theory & Practice Pages*, 16, (4): 457–469.
- Brandt, S. D., Braithwaite, R. A., Evans-Brown, M. and Kicman, A. T. (2013) 'Aminoindane Analogues'. In: P. Dargan and D. Wood (Eds.) *Novel Psychoactive Substances: Classification, Pharmacology and Toxicology*. Academic Press: London, pp. 79-103.
- Braun, V. and Clarke, V. (2006) 'Using thematic analysis in psychology', *Qualitative Research in Psychology*, 3: (2) 77-101.
- Bright, S. J., Bishop, B., Kane, R., Marsh, A. and Barratt, M. J. (2013) 'Kronic hysteria: Exploring the intersection between Australian synthetic cannabis legislation, the media, and drug-related harm', *International Journal of Drug Policy*, 24, (3): 231-237.
- Bruneel, C., Lakhdar, C. B. and Vaillant, N. G. (2014) 'Are "Legal Highs" Users Satisfied? Evidence from Online Customer Comments', *Substance Use & Misuse*, 49, 364–373.

- Bruno, R., Matthews, A. J., Dunn, M., Alati, R., McIlwraith, F., Hickey, S., Burns, L. and Sindicich, N. (2012) 'Emerging psychoactive substance use among regular ecstasy users in Australia', *Drug and Alcohol Dependence*, 124, (1-2): 19-25.
- Bruno, R., Poesiat, R. and Matthews, A. J. (2013) 'Monitoring the Internet for emerging psychoactive substances available to Australia', *Drug and Alcohol Review*, 32, (5): 541-544.
- Brunt, T. M., Poortman, A., Niesink, R. J. and van den Brink, W. (2011) 'Instability of the ecstasy market and a new kid on the block: mephedrone', *The Journal of Psychopharmacology*, 25, (11): 1543-7.
- Brunt, T. M., Atkinson, A. M., Nefau, T., Martinez, M., Lahaie, E., Malzcewski, A., Pazitny, M., Belackova, V. and Brandt, S. D. (2017) 'Online test purchased new psychoactive substances in 5 different European countries: A snapshot study of chemical composition and price', *International Journal of Drug Policy*, 44, 105-114.
- Burke-Johnson, R. and Onwuegbuzie, A. J. (2004) 'Mixed Methods Research: A Research Paradigm Whose Time Has Come', *Educational Researcher*, 33, (7): 14-26.
- Burns, L., Roxburgh, A., Bruno, R. and Van Buskirk, J. (2014a) 'Monitoring drug markets in the Internet age and the evolution of drug monitoring systems in Australia', *Drug testing and analysis*, 6, (7-8): 840-5.
- Burns, L., Roxburgh, A., Matthews, A., Bruno, R., Lenton, S. and Van Buskirk, J. (2014b) 'The rise of new psychoactive substance use in Australia', *Drug Testing and Analysis*, 6, (7-8): 846-849.
- Carhart-Harris, R. L., King, L. A. and Nutt, D. J. (2011) 'A web-based survey on mephedrone', *Drug and Alcohol Dependence*, 118, (1): 19-22.
- Carlson, R. G., Falck, R. S., McCaughan, J. A. and Siegal, H. A. (2004) 'MDMA/Ecstasy use among young people in Ohio: Perceived risk and barriers to intervention', *Journal of Psychoactive Drugs*, 36, (2): 181-189.
- Castaneto, M. S., Gorelick, D. A., Desrosiers, N. A., Hartman, R. L., Pirard, S. and Huestis, M. A. (2014) 'Synthetic cannabinoids: Epidemiology, pharmacodynamics, and clinical implications', *Drug and Alcohol Dependence*, 144, 12-41.
- Caulkins, J. and Reuter, P. (1998) 'What price data tells us about drug markets', *Journal of Drug Issues*, 28, 593-612.
- Chatwin, C. (2013) 'A critical evaluation of the European drug strategy: Has it brought added value to drug policy making at the national level?', *International Journal of Drug Policy*, 24, (3): 251-256.

- Chatwin, C. (2017) 'Assessing the 'added value' of European policy on new psychoactive substances', *International Journal of Drug Policy*, 40, 111-116.
- Chatwin, C., Measham, F., O'Brien, K. and Sumnall, H. (2017) 'New drugs, new directions? Research priorities for new psychoactive substances and human enhancement drugs', *International Journal of Drug Policy*, 40, 1-5.
- Cho, Y., Hwang, J. and Lee, D. (2012) 'Identification of effective opinion leaders in the diffusion of technological innovation: A social network approach', *Technological Forecasting and Social Change*, 79, (1): 97-106.
- Chu, S.C. (2009) 'Determinants of consumer engagement in electronic word-of-mouth in social networking sites', *International Journal of Advertising*, 30, (1): 47-75.
- Clark, B. C., Georgekutty, J. and Berul, C. I. (2015) 'Myocardial Ischemia Secondary to Synthetic Cannabinoid (K2) Use in Pediatric Patients', *The Journal of Pediatrics*, 1-6.
- Claudy, M. C., Michelsen, C. and O'Driscoll, A. (2011) 'The diffusion of microgeneration technologies – assessing the influence of perceived product characteristics on home owners' willingness to pay', *Energy Policy*, 39, (3): 1459-1469.
- Cohen, B. M. and Butler, R. (2011) 'BZP-party pills: a review of research on benzylpiperazine as a recreational drug', *International Journal of Drug Policy*, 22, (2): 95-101.
- Collins, C. E., Pringle, P. L. and Santry, H. P. (2015) 'Innovation or rebranding, acute care surgery diffusion will continue', *Journal of Surgical Research*, 1-9.
- Concheiro, M., Castaneto, M., Kronstrand, R. and Huestis, M. A. (2015) 'Simultaneous determination of 40 novel psychoactive stimulants in urine by liquid chromatography–high resolution mass spectrometry and library matching', *Journal of Chromatography A*, 1397, 32–42.
- Coomber, R. (2006) *Pusher myths: Re-situating the drug dealer*, Free Association: London.
- Coppola, M. and Mondola, R. (2012) 'Synthetic cathinones: chemistry, pharmacology and toxicology of a new class of designer drugs of abuse marketed as "bath salts" or "plant food"', *Toxicology Letters*, 211, (2): 144-9.
- Coppola, M. and Mondola, R. (2015) '4,4-DMAR: Chemistry, Pharmacology and Toxicology of a New Synthetic Stimulant of Abuse', *Basic & Clinical Pharmacology & Toxicology*, 117, 26–30.
- Coppola, M., Mondola, R., Oliva, F., Picci, R. L., Ascheri, D. and Trivelli, F. (2016) 'Chapter 63 - Treating the Phenomenon of New Psychoactive Substances: Synthetic Cannabinoids and Synthetic Cathinones'. In V. R. Preedy (Eds.) *Neuropathology of Drug Addictions and Substance Misuse*. Academic Press: San Diego, pp. 679–686.

Corazza, O., Schifano, F., Farre, M., Deluca, P., Davey, Z., Torrens, M., Demetrovics, Z., di Furia, L., Flesland, L., Siemann, H., Skutle, A., van der Kreeft, P. and Scherbaum, N. (2011) 'Designer drugs on the internet: a phenomenon out-of-control? The emergence of hallucinogenic drug Bromo-Drumstick', *Current Clinical Pharmacology*, 6, (2):125-9.

Corazza, O., Schifano, F., Simonato, P., Fergus, S., Assi, S., Stair, J., Corkery, J., Trincas, G., Deluca, P., Davey, Z., Blaszkowski, U., Demetrovics, Z., Moskalewicz, J., Enea, A., di Melchiorre, G., Mervo, B., di Furia, L., Farre, M., Flesland, L., Pasinetti, M., Pezzolessi, C., Pisarska, A., Shapiro, H., Siemann, H., Skutle, A., Enea, A., di Melchiorre, G., Sferrazza, E., Torrens, M., van der Kreeft, P., Zummo, D. and Scherbaum, N. (2012) 'Phenomenon of new drugs on the Internet: the case of ketamine derivative methoxetamine', *Human Psychopharmacology*, 27, (2):145-9.

Corazza, O., Assi, S., Simonato, P., Corkery, J., Bersani, F. S., Demetrovics, Z., Stair, J., Fergus, S., Pezzolessi, C., Pasinetti, M., Deluca, P., Drummond, C., Davey, Z., Blaszkowski, U., Moskalewicz, J., Mervo, B., Furia, L. D., Farre, M., Flesland, L., Pisarska, A., Shapiro, H., Siemann, H., Skutle, A., Sferrazza, E., Torrens, M., Sambola, F., van der Kreeft, P., Scherbaum, N. and Schifano, F. (2013a) 'Promoting innovation and excellence to face the rapid diffusion of Novel Psychoactive Substances in the EU: the outcomes of the ReDNet project', *Human Psychopharmacology: Clinical and Experimental*, 28, (4): 317-323.

Corazza, O., Demetrovics, Z., van den Brink, W. and Schifano, F. (2013b) "'Legal highs' an inappropriate term for 'Novel Psychoactive Drugs' in drug prevention and scientific debate', *International Journal of Drug Policy*, 24, 82– 83.

Corazza, O., Simonato, P., Corkery, J., Trincas, G. and Schifano, F. (2014a) "'Legal highs": safe and legal "heavens"? A study on the diffusion, knowledge and risk awareness of novel psychoactive drugs among students in the UK', *Rivista di Psichiatria*, 49, (2): 89-94.

Corazza, O., Valeriani, G., Bersani, F. S., Corkery, J., Martinotti, G., Bersani, G. and Schifano, F. (2014b) "'Spice," "Kryptonite," "Black Mamba": An Overview of Brand Names and Marketing Strategies of Novel Psychoactive Substances on the Web', *Journal of Psychoactive Drugs*, 46, (4): 287–294.

Corrigan, J. A. (2012) 'The implementation of e-tutoring in secondary schools: A diffusion study', *Computers & Education*, 59, (3): 925-936.

Cronje, R. J. and Moch, S. D. (2010) 'Part III. Reenvisioning undergraduate nursing students as opinion leaders to diffuse evidence-based practice in clinical settings', *Journal of Professional Nursing*, 26, (1): 23-8.

- Crook, B., Stephens, K. K., Pastorek, A. E., Mackert, M. and Donovan, E. E. (2015) 'Sharing Health Information and Influencing Behavioral Intentions: The Role of Health Literacy, Information Overload, and the Internet in the Diffusion of Healthy Heart Information', *Health Communication*, 1-12.
- Cunliffe, J., Matin, J., Décary-Hétu, D. and Aldridge, J. (2017) 'An island apart? Risks and prices in the Australian cryptomarket drug trade', *International Journal of Drug Policy*, 50, 64–73.
- Curtis, B., Alanis-Hirsch, K., Kaynak, O., Cacciola, J., Meyers, K. and McLellan, A. T. (2015) 'Using Web searches to track interest in synthetic cannabinoids (aka 'herbal incense')', *Drug and Alcohol review*, 34, (1): 105-8.
- Dabrowska, K. and Bujalski, M. (2013) 'The legal highs problem in the Polish printed media--actors, claims, and its hidden meanings', *Substance Use & Misuse*, 48, (1-2): 31-40.
- Davey, Z., Corazza, O., Schifano, F. and Deluca, P. (2010) 'Mass-information: mephedrone, myths, and the new generation of legal highs', *Drugs and Alcohol Today*, 10, (3): 24-28.
- Davey, Z., Schifano, F., Corazza, O., Deluca, P. and Psychonaut Web Mapping Group (2015) 'e-Psychonauts: Conducting research in online drug forum communities', *Journal of Mental Health*, 21, (4): 386-94.
- Davidson, C. (2012) 'New psychoactive substances', *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, 39, 219–220.
- Davies, S., Wood, D. M., Smith, G., Button, J., Ramsey, J., Archer, R., Holt, D. W. and Dargan, P. I. (2010) 'Purchasing 'legal highs' on the Internet--is there consistency in what you get?', *QJM*, 103, (7): 489-93.
- Dean, B. V., Stellpflug, S. J., Burnett, A. M. and Engebretsen, K. M. (2013) '2C or Not 2C: Phenethylamine Designer Drug Review', *The Journal of Medical Toxicology*, 9, 172–178.
- Dearing, J. W. and Singhal, A. (2006) 'Communication of innovations: A journey with Ev Rogers'. In A. Singhal and J. W. Dearing (Eds.) *Communication of innovations: A journey with Ev Rogers*. Sage Publications: Thousand Oaks, CA, pp. 15-28.
- Deligianni, E., Corkery, J. M., Schifano, F. and Lione, L. A. (2017) 'An international survey on the awareness, use, preference, and health perception of novel psychoactive substances (NPS)', *Human psychopharmacology*, 1-9.
- Deluca, P., Davey, Z., Corazza, O., Di Furia, L., Farre, M., Flesland, L. H., Mannonen, M., Majava, A., Peltoniemi, T., Pasinetti, M., Pezzolesi, C., Scherbaum, N., Siemann, H., Skutle, A., Torrens, M., van der Kreeft, P., Iversen, E. and Schifano, F. (2012) 'Identifying emerging trends in recreational

drug use; outcomes from the Psychonaut Web Mapping Project', *Progress in neuro-psychopharmacology and biological psychiatry*, 39, (2): 221-6.

Deroian, F. (2002) 'Formation of social networks and diffusion of innovations', *Research Policy*, 31, 835–846.

Diaz-Rainey, I. and Ashton, J. K. (2015) 'Investment inefficiency and the adoption of eco-innovations: The case of household energy efficiency technologies', *Energy Policy*, 82, 105-117.

Dorner, D. G. (2009) 'Public sector readiness for digital preservation in New Zealand: The rate of adoption of an innovation in records management practices', *Government Information Quarterly*, 26, (2): 341-348.

Doyle, G. J., Garrett, B. and Currie, L. M. (2014) 'Integrating mobile devices into nursing curricula: opportunities for implementation using Rogers' Diffusion of Innovation model', *Nurse Education Today*, 34, (5): 775-82.

Duke, K. (2002) 'Getting Beyond the 'Official Line': Reflections on Dilemmas of Access, Knowledge and Power in Researching Policy Networks', *Journal of Social Policy*, 31, 1, 39–59.

Duxbury, S. W. (2015) 'Information creation on online drug forums: How drug use becomes moral on the margins of science', *Current Sociology*, 1–18.

Duxbury, S. W. and Haynie, D. L. (2018) 'Building them up, breaking them down: Topology, vendor selection patterns, and a digital drug market's robustness to disruption', *Social Networks*, 52, 238–250.

Dybdal-Hargreaves, N. F., Holder, N. D., Ottoson, P.E., Sweeney, M. D. and Williams, T. (2013) 'Mephedrone: Public health risk, mechanisms of action, and behavioral effects', *European Journal of Pharmacology*, 714, 32–40.

Eder, J. M., Mutsaerts, C. and Sriwannawit, P. (2015) 'Mini-grids and renewable energy in rural Africa: How diffusion theory explains adoption of electricity in Uganda', *Energy Research and Social Science*, 5, 45-54.

Egan, K. L., Suerken, C. K., Reboussin, B. A., Spangler, J., Wagoner, K. G., Sutfin, E. L., Debinski, B. and Wolfson, M. (2015) 'K2 and Spice use among a cohort of college students in southeast region of the USA', *The American Journal of Drug and Alcohol Abuse*, 41, (4): 317-22.

Elliott, S. and Evans, J. (2014) 'A 3-year review of new psychoactive substances in casework', *Forensic science international*, 243, 55-60.

EMCDDA (2011) *Briefing Paper: Online Sales of New Psychoactive Substances/ 'Legal Highs': Summary of Results from the 2011 Multilingual Snapshots*, Publications Office of the European Union: Luxembourg.

EMCDDA (2012) *Early Warning System Profiles*, Publications Office of the European Union: Luxembourg.

EMCDDA (2014) *European Drug Report: Trends and Developments*, Publications Office of the European Union: Luxembourg.

EMCDDA (2015a) *ESPAD Report 2015: Results from the European School Survey Project on Alcohol and Other Drugs*, Publications Office of the European Union: Luxembourg.

EMCDDA (2015b) *New psychoactive substances in Europe: An update from the EU Early Warning System*, Publications Office of the European Union: Luxembourg.

EMCDDA (2015c) *New psychoactive substances in Europe: Innovative legal responses*, Publications Office of the European Union: Luxembourg.

EMCDDA (2016a) *European Drug Report*, Publications Office of the European Union: Luxembourg.

EMCDDA (2016b), *Hospital emergency presentations and acute drug toxicity in Europe: update from the Euro-DEN Plus research group and the EMCDDA*, Publications Office of the European Union: Luxembourg.

EMCDDA (2017) *European Drug Report*, Publications Office of the European Union: Luxembourg.

EMCDDA and Europol (2013) *EU Drug Markets Report: A strategic Analysis*, Publications Office of the European Union: Luxembourg.

EMCDDA and Europol (2017) *Drugs and the darknet: Perspectives for enforcement, research and policy*, EMCDDA–Europol Joint publications, Publications Office of the European Union: Luxembourg.

European Commission (2014) *Young people and drugs: Flash Eurobarometer 401*, European Union.

European Commission (2016) *Young people and drugs: Flash Eurobarometer 401*, European Union.

Evans-Brown, M. and Sedefov, R. (2017) 'New psychoactive substances: driving greater complexity into the drug problem', *Addiction*, 112, (1): 36-38.

Feder, G. and Savastano, S. (2006) 'The role of opinion leaders in the diffusion of new knowledge: The case of integrated pest management', *World Development*, 34, (7): 1287-1300.

- Fernández-Calderón, F., Cleland, C. M. and Palamar, J. J. (2018) 'Polysubstance use profiles among electronic dance music party attendees in New York City and their relation to use of new psychoactive substances', *Addictive Behaviors*, 78, 85-93.
- Ferrence, R. (2001) 'Environmental Factors: Diffusion Theory and drug use', *Addiction*, 96, 165–173.
- Fetters, M. D., Curry, L. A. and Creswell, J. W. (2013) 'Achieving Integration in Mixed Methods Designs—Principles and Practices', *Health Services Research*, 48: (6): 2134-2156.
- Fischer, C. S., Jackson, R. M., Stueve, C. A., Gerson, K., Jones, C. M. and Baldassrae, M. (1977) *Networks and Places: Social Relations in the urban setting*, Free Press: New York.
- Fletcher, E. H., Tasker, S. M., Easton, P. and Denvir, L. (2016) 'Improving the help and support provided to people who take new psychoactive substances ('legal highs')', *Journal of public health*, 38, (4): e489-e495.
- Forsyth, A. J. M. (2012) 'Virtually a drug scare: Mephedrone and the impact of the Internet on drug news transmission', *International Journal of Drug Policy*, 23, (3): 198-209.
- Freeman, T. P., Morgan, C. J., Vaughn-Jones, J., Hussain, N., Karimi, K. and Curran, H. V. (2012) 'Cognitive and subjective effects of mephedrone and factors influencing use of a 'new legal high'', *Addiction*, 107, 792–800.
- Fuller, E. (2015) *Smoking, drinking and drug use among young people in England in 2014 Report*, Health and Social Care Information Centre.
- Furst, R. T. (2014) 'Diffusion and diversion of suboxone: an exploration of illicit street opioid selling', *Journal of Addictive Diseases*, 33, 177–186.
- Gayadeen, S. M. and Phillips, S. W. (2014) 'The innovation of community policing and the COPS Office: does diffusion of innovation theory hold in a manipulated environment?', *International Journal of Police Science and Management*, 16, (3): 228-242.
- Gelders, D., Patesson, R. and Vandoninck, S. (2009) 'The influence of warning messages on the public's perception of substance use: a theoretical framework', *Government Information Quarterly*, 26, 349–57.
- Global Drugs Survey (2016) 'Key findings from The Global Drug Survey 2016'. Accessed January 2017. Available at: <https://www.globaldrugsurvey.com/past-findings/the-global-drug-survey-2016-findings/>
- German, C. L., Fleckenstein, A. E. and Hanson, G. R. (2014) 'Bath salts and synthetic cathinones: An emerging designer drug phenomenon', *Life Sciences*, 97, (1): 2-8.

- Giné, C. V., Espinosa, I. F. and Vilamala, M. V. (2014) 'New psychoactive substances as adulterants of controlled drugs. A worrying phenomenon?', *Drug Testing and Analysis*, 6, (7-8): 819-824.
- Goggin, L. S., Gately, N. and Bridle, R. I. (2015) 'Novel Psychoactive Substance and Other Drug Use by Young Adults in Western Australia', *Journal of Psychoactive Drugs*, 47, (2): 140-148.
- Goldstein, K. (2002) 'Getting in the Door: Sampling and Completing Elite Interviews', *Political Science and Politics*, 35, (4): 669-672.
- Golub, A. and Johnson, B. D. (1996) 'The Crack Epidemic: Empirical Findings Support an Hypothesized Diffusion of Innovation Process', *Socio-Economic Planning Sciences*, 30, (3): 221-231.
- Gonzalez, D., Ventura, M., Caudevilla, F., Torrens, M. and Farre, M. (2013) 'Consumption of new psychoactive substances in a Spanish sample of research chemical users', *Human Psychopharmacology*, 28, (4): 332-40.
- Goodair, C. M., Corkery, J. and Claridge, H. (2014) 'Legal highs: a problem of definitions?', *The Lancet*, 383, (9930): 1715.
- Greaves, L. (2014) 'Gender, equity and tobacco control', *Health Sociology Review*, 16, (2): 115-129.
- Green, P. E. and Srinivasan, V. (1990) 'Conjoint Analysis in Marketing Research: New Developments and Directions', *Journal of Marketing*, 54, (4): 3-19.
- Greenhalgh, T., Robert, G., MacFarlane, F., Bate, P. and Kyriakidou, O. (2004) 'Diffusion of Innovations in Service Organizations: Systematic Review and Recommendations', *The Milbank Quarterly*, 82, (4): 581-629.
- Greer, A. L. (1977) 'Advances in the Study of Diffusion of Innovation in Health Care Organizations', *Health and Society*, 55, (4): 505-532.
- Greve, H. R. (2011) 'Fast and expensive: the diffusion of a disappointing innovation', *Strategic Management Journal*, 32, (9): 949-968.
- Griffiths, P., Vingoe, L., Hunt, N., Mounteney, J. and Hartnoll, R. (2000) 'Drug information systems, early warning, and new drug trends: can drug monitoring systems become more sensitive to emerging trends in drug consumption?', *Substance use and misuse*, 35, (6-8): 811-44.
- Griffiths, P., Sedefov, R., Gallegos, A. and Lopez, D. (2010) 'How globalization and market innovation challenge how we think about and respond to drug use: 'Spice' a case study', *Addiction*, 105, (6): 951-3.

- Gunderson, E. W., Haughey, H. M., Ait-Daoud, N., Joshi, A. S. and Hart, C. L. (2014) 'A Survey of Synthetic Cannabinoid Consumption by Current Cannabis Users', *Substance Abuse*, 35, (2): 184-189.
- Haden, M., Wood, D. M. and Dargan, P. I. (2017) 'The impact of the Psychoactive Substances Act 2016 on the online availability of MDMB-CHMICA', *QJM*, 1-4.
- Haider, M. and Kreps, G. L. (2004) 'Forty years of diffusion of innovations: utility and value in public health', *Journal of Health Communication: International Perspectives*, 9, (1): 3-11.
- Hair, J. F., Black, W. C., Babin, B. J. and Anderson, R. E. (2010) *Multivariate data analysis: A global perspective*, Seventh Edition, Pearson: New Jersey.
- Harrer, B. J., Weijo, R. O. and Hatstrup, M. P. (1988) 'The Role of Change Agents in New Product Adoption: A Case Study', *Industrial Marketing Management*, 17, 95- 102.
- Harrison, T. and Waite, K. (2006) 'A time-based assessment of the influences, uses and benefits of intermediary website adoption', *Information & Management*, 43, (8): 1002-1013.
- Helander, A., Backberg, M., Hulten, P., Al-Saffar, Y. and Beck, O. (2014) 'Detection of new psychoactive substance use among emergency room patients: results from the Swedish STRIDA project', *Forensic Science International*, 243, 23-9.
- Heri, S. and Mosler, H. J. (2008) 'Factors affecting the diffusion of solar water disinfection: a field study in Bolivia', *Health Education & Behavior*, 35, (4): 541-60.
- Hillebrand, J., Olszewski, D. and Sedefov, R. (2010) 'Legal highs on the Internet', *Substance Use & Misuse*, 45, (3): 330-40.
- HM Inspectorate of Prisons (HMIP) (2015) *HM Chief Inspector of Prisons for England and Wales: Annual report 2014-15*. Accessed June 2017. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/444785/hmip-2014-15.pdf.
- HM The Government (2017) *2017 Drug Strategy*. Accessed June 2017. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/628148/Drug_strategy_2017.PDF
- Home Office (2011) *Drug Misuse Declared: Findings from the 2010/11 British Crime Survey England and Wales*, Home Office Statistical Bulletin.
- Home Office (2015a) *Creation of a blanket ban on new psychoactive substances in the UK, Impact Assessment*. Accessed August 2017. Available at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/433151/NPSGBImpactAssessment.pdf

Home Office (2015b) *Annual Report on the Home Office Forensic Early Warning System (FEWS): A system to identify New Psychoactive Substances (NPS) in the UK*. Accessed August 2017. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/461333/1280_EL_FEWS_Annual_Report_2015_WEB.pdf

Home Office (2015c) *Psychoactive Substances Bill Factsheet: Overview of the Misuse of Drugs Act 1971*. Accessed August 2017. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/455578/20150821_-_Fact_sheet_-_MDA.pdf

Home Office (2015d) *Psychoactive Substances Bill: Fact sheet: Background to the Bill*. Accessed September 2017. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/455591/20150821_-_Fact_sheet_-_background_to_the_Bill.pdf

Home Office (2016) *Drug Misuse: Findings from the 2015/16 Crime Survey for England and Wales*, Home Office.

Home Office (2017a) *Drug Misuse: Findings from the 2016/17 Crime Survey for England and Wales*, Home Office.

Home Office (2017b) *The Psychoactive Substances Act Review Framework*, Home Office. Accessed January 2018. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627692/Psychoactive_Substances_Act_Review_Framework.pdf

Hondebrink, L., Nugteren-van Lonkhuyzen, J. J., Van Der Gouwe, D. and Brunt, T. M. (2015) 'Monitoring new psychoactive substances (NPS) in The Netherlands: Data from the drug market and the Poisons Information Centre', *Drug and Alcohol Dependence*, 147, 109-115.

House of Commons Home Affairs Committee (2015) *Psychoactive substances: First Report of Session 2015–16*. Accessed January 2017. Available at: <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/home-affairs-committee/psychoactive-substances/oral/21599.pdf>

Hu, Y. (2013) 'Hyperlinked actors in the global knowledge communities and diffusion of innovation tools in nascent industrial field', *Technovation*, 33, (2-3): 38-49.

- Hubbard, S. M. and Hayashi, S. W. (2003) 'Use of diffusion of innovations theory to drive a federal agency's program evaluation', *Evaluation and Program Planning*, 26, 49–56.
- Hughes, B. and Winstock, A. R. (2011) 'Controlling new drugs under marketing regulations', *Addiction*, 107, (11): 1894-9.
- Hung, C-L., Chou, J. C-L. and Dong, T-P. (2011) 'Innovations and communication through innovative users: An exploratory mechanism of social networking website', *International Journal of Information Management*, 31, 317–326.
- Hunt, M. G., Bergeron, H. and Milhet, M. (2013) *Drugs and culture: Knowledge, consumption and policy*, Ashgate Publishing: Farnham.
- Ifeagwu, S. C., Raitelhuber, M., Crean, C., Gerostamoulos, D., Chung, H. and Tettey, J. N. (2017) 'Toxicology in international drug control—Prioritizing the most harmful, persistent and prevalent substances', *Forensic Science International*, 274, 2-6.
- Institóris, L., Árok, Z., Seprenyi, K., Varga, T., Sára-Klausz, G., Keller, É., Tóth Réka, A., Sala, L., Kereszty, É. and Róna, K. (2015) 'Frequency and structure of stimulant designer drug consumption among suspected drug users in Budapest and South-East Hungary in 2012–2013', *Forensic Science International*, 248, 181-186.
- Jacobs, B. (1999) *Dealing Crack*, Northeastern University Press: Michigan.
- Jahanmir, S. F. and Lages, L. F. (2015) 'The late-adopter scale: A measure of late adopters of technological innovations', *Journal of Business Research*, 1-6.
- Jebadurai, J., Schifano, F. and Deluca, P. (2013) 'Recreational use of 1-(2-naphthyl)-2-(1-pyrrolidinyl)-1-pentanone hydrochloride (NRG-1), 6-(2-aminopropyl) benzofuran (benzofury/ 6-APB) and NRG-2 with review of available evidence-based literature', *Human Psychopharmacology*, 28, (4): 356-64.
- Jervis, S. M., Ennis, J. M. and Drake, M. A. (2012) 'A comparison of adaptive choice-based conjoint and choice-based conjoint to determine key choice attributes of sour cream with limited sample size', *Journal of Sensory Studies*, 27, 451-462.
- Jin, C-H. (2013) 'The effects of individual innovativeness on users' adoption of Internet content filtering software and attitudes toward children's Internet use', *Computers in Human Behavior*, 29, (5): 1904-1916.
- John-Smith, P. S., McQueen, D., Edwards, L. and Schifano, F. (2013) 'Classical and novel psychoactive substances: rethinking drug misuse from an evolutionary psychiatric perspective', *Human Psychopharmacology: Clinical and Experimental*, 28: 394–401.

- Johnson, B. D. and Golub, A. (2007) 'The potential for accurately measuring behavioral and economic dimensions of consumption, prices, and markets for illegal drugs', *Drug and Alcohol Dependence*, 90, (S1): S16-S26.
- Johnson, L. A., Johnson, R. L. and Portier, R. B. (2013) 'Current "legal highs"', *The Journal of Emergency Medicine*, 44, (6): 1108-15.
- Johnson, R. M and Orme, B. K. (1996) 'How many questions should you ask in choice-based conjoint studies?', *Sawtooth software research paper series*.
- Johnston, L. D. (1991) 'Toward a theory of drug epidemics'. In R. L. Donohew, H. Sypher, and W. Bukowski (Eds.) *Persuasive Communication and Drug Abuse Prevention*. Lawrence Erlbaum: Hillsdale, NJ, pp. 93-132.
- Kapitany-Foveny, M., Mervo, B., Kertesz, M., Corazza, O., Farkas, J., Kokonyei, G., Urban, R. and Demetrovics, Z. (2015) 'Is there any difference in patterns of use and psychiatric symptom status between injectors and non-injectors of mephedrone?', *Human Psychopharmacology*, 30, (4): 233-43.
- Kapka-Skrzypczak, L., Kulpa, P., Sawicki, K., Cyranka, M., Wojtyła, A. and Kruszewski, M. (2011) 'Legal highs – legal aspects and legislative solutions', *Annals of Agricultural and Environmental Medicine*, 18, (2): 304-309.
- Karakaya, E., Hidalgo, A. and Nuur, C. (2015) 'Motivators for adoption of photovoltaic systems at grid parity: A case study from Southern Germany', *Renewable and Sustainable Energy Reviews*, 43, 1090-1098.
- Kardong-Edgren, S. (2008) 'You may have heard of diffusion of innovation...but did you know about Moore's Chasm?', *Clinical Simulation in Nursing*, 4, (1): e1-e2.
- Karila, L., Megarbane, B., Cottencin, O. and Lejoyeux, M. (2015) 'Synthetic Cathinones: A New Public Health Problem', *Current Neuropharmacology*, 13, 12-20.
- Karila, L., Billieux, J., Benyamina, A., Lançon, C. and Cottencin, O. (2016) 'The effects and risks associated to Mephedrone and Methylone in humans: A review of the preliminary evidences', *Brain Research Bulletin*, 1-18.
- Kassai, S., Pinter, J. N., Racz, J., Borondi, B., Toth-Kariko, T., Kerekes, K. and Gyarmathy, V. A. (2017a) 'Assessing the experience of using synthetic cannabinoids by means of interpretative phenomenological analysis', *Harm Reduction Journal*, 14, (1): 9.

- Kassai, S., Rácz, J., Nagy, A., Bíbók, T., Galambvári, E., Kilián, C. and Gyarmathy, V. A. (2017b) 'Someone Else's Problem': New Psychoactive Substances in the Online Hungarian Media', *Journal of Psychoactive Drugs*, 49, (1): 47-51.
- Katz, E., Levin, M. L. and Hamilton, H. (1963) 'Traditions of Research on the Diffusion of Innovation', *American Sociological Review*, 28, (2): 237-252.
- Kavanagh, P. V. and Power, J. D. (2014) 'New psychoactive substances legislation in Ireland – Perspectives from academia', *Drug Testing and Analysis*, 6, (7-8): 884-891.
- Kelly, B. C. (2011) 'Legally Tripping: A Qualitative Profile of *Salvia Divinorum* Use Among Young Adults', *Journal of Psychoactive Drugs*, 43, (1): 46-54.
- Kelly, B. C., Wells, B. E., Pawson, M., Leclair, A., Parsons, J. T. and Golub, S. A. (2013) 'Novel psychoactive drug use among younger adults involved in US nightlife scenes', *Drug and Alcohol Review*, 32, (6): 588-593.
- Keyes, K. M., Rutherford, C., Hamilton, A. and Palamar, J. J. (2016) 'Age, period, and cohort effects in synthetic cannabinoid use among US adolescents, 2011–2015', *Drug and Alcohol Dependence*, 166, 159–167.
- Khey, D. N., Miller, B. L. and Griffin, O. H. (2008) 'Salvia divinorum use among a college student sample', *Journal of Drug Education*, 38, (3): 297-306.
- Khey, D. N., Stogner, J. and Miller, B. L. (2014) *Emerging Trends in Drug Use and Distribution*, SpringerBriefs in Criminology: Heidelberg, New York, Dordrecht, London.
- Kievit, W., van Hulst, L., van Riel, P. and Fraenkel, L. (2010) 'Factors that influence rheumatologists' decision to escalate care in RA: Results from a choice based conjoint analysis', *Arthritis Care & Research*, 62, (6): 842–847.
- King, L. A. and Nutt, D. J. (2014) 'Legal highs: a problem of definitions? – Authors' reply', *The Lancet*, 383, (9930): 1715-1716.
- Kjellgren, A. and Jonsson, K. (2013) 'Methoxetamine (MXE)--a phenomenological study of experiences induced by a "legal high" from the internet', *Journal of psychoactive drugs*, 45, (3): 276-86.
- Kolliakou, A., Ball, M., Derczynski, L., Chandran, D., Gkotsis, G., Deluca, P., Jackson, R., Shetty, H. and Stewart, R. (2016) 'Novel psychoactive substances: An investigation of temporal trends in social media and electronic health records', *European Psychiatry*, 38, 15-21.
- Kozinets, R. V. (2002). 'The field behind the screen: Using netnography for marketing research in online communities', *Journal of Marketing Research*, 39, (1): 61–72.

Krathwohl, D. R. (1998) *Methods of educational & social science research: An integrated approach*, Second Edition, Addison Wesley Longman, Inc: White Plains, NY.

Krohn, M. D. and Thornberry, T. P. (1993) 'Network theory: a model for understanding drug abuse among African-American and Hispanic youth', *NIDA Research Monograph Index*, 130, 102-28.

Lamy, F. R., Daniulaityte, R., Nahhas, R. W., Barratt, M. J., Smith, A. G., Sheth, A., Martins, S. S., Boyer, E. W. and Carlson, R. G. (2017) 'Increased in synthetic cannabinoids-related harms: Results from a longitudinal web-based content analysis', *International Journal of Drug Policy*, 44, 121-129.

Lancaster, K., Hughes, C. E., Spicer, B., Matthew-Simmons, F. and Dillon, P. (2011) 'Illicit drugs and the media: Models of media effects for use in drug policy research', *Drug and Alcohol Review*, 30, 397-402.

Lancaster, K. (2017) 'Confidentiality, anonymity and power relations in elite interviewing: conducting qualitative policy research in a politicised domain', *International Journal of Social Research Methodology*, 20, (1): 93-103.

Lauritsen, K. J. and Rosenberg, H. (2016) 'Comparison of outcome expectancies for synthetic cannabinoids and botanical marijuana', *The American Journal of Drug and Alcohol Abuse*, 42, 377-384.

Ledberg, A. (2015) 'The interest in eight new psychoactive substances before and after scheduling', *Drug and Alcohol Dependence*, 152, 73-78.

Lewman, A. (2016) 'Tor and links with cryptomarkets'. In EMCDDA (Ed.) *Internet and drug markets, EMCDDA insights*. Publications Office of the European Union: Luxembourg, pp. 33-40.

Liechti, M. E. (2015) 'Novel psychoactive substances (designer drugs): overview and pharmacology of modulators of monoamine signalling', *Swiss Medical Weekly*, 145, (w14043): 1-12.

Lilleker, D. G. (2003) 'Interviewing the Political Elite: Navigating a Potential Minefield', *Politics*, 23, (3): 207-214.

Lillie, S. E. (2008) 'Diffusion of innovation in the age of YouTube', *American Journal of Preventive Medicine*, 34, (3): 267.

Lin, A. and Chen, N-C. (2012) 'Cloud computing as an innovation: Perception, attitude, and adoption', *International Journal of Information Management*, 32, (6): 533-540.

Lin, M-S and Wu, F-S. (2013) 'Identifying the determinants of broadband adoption by diffusion stage in OECD countries', *Telecommunications Policy*, 37, (4-5): 241-251.

Lindsay, L. and White, M. L. (2013) 'Herbal Marijuana Alternatives and Bath Salts— "Barely Legal" Toxic Highs', *Clinical Pediatric Emergency Medicine*, 13, (4): 283-291.

Linnell, M., Measham, F. and Newcombe, R. (2015) *New psychoactive substances: The local picture, a research study and needs assessment for Blackburn with Darwen Council*, Manchester: Linnell Publications.

Local Government Association (2015) *A councillors' guide to tackling new psychoactive substances*. Accessed June 2016. Available at: <https://www.local.gov.uk/sites/default/files/documents/councillors-guide-tacklin-55c.pdf>

Loeffler, G., Delaney, E. and Hann, M. (2016) 'International Trends in Spice Use: Prevalence, Motivation for Use, Relationship to Other Substances, and Perception of Use and Safety for Synthetic Cannabinoids', *Brain Research Bulletin*, 1-43.

Long, M., Chei, S., Lee, D. and Hoe-Lian, G. (2014) 'Understanding news sharing in social media', *Online Information Review*, 38, (5): 598–615.

Louviere, J. J. (1988) 'Conjoint analysis modelling of stated preferences: A review of theory, methods, recent developments and external validity', *Journal of Transport Economics and Policy*, 22, (1): 93–119.

Louviere, J. J., Flynn, T. N. and Carson, R. T. (2010) 'Discrete Choice Experiments Are Not Conjoint Analysis', *Journal of Choice Modelling*, 3, (3): 57-72.

Ma, L., Sian Lee, C. and Hoe-Lian Goh, D. (2014) 'Understanding news sharing in social media', *Online Information Review*, 38, (5): 598-615.

Mahapatra, A. and Sharma, P. (2016) 'Internet snapshot survey: A novel methodology to monitor novel psychotropic substances and its need in Asia', *Asian Journal of Psychiatry*, 21, 7-8.

Malczewski, A., Misiurek, A., Bukowska, B., Chojecki, D., Jabłonski, P., Kidawa, M., et al. (2015) *National Drug Report 2014*, Warsaw, Poland: Krajowe Biuro ds. Przeciwdziałania Narkomanii.

Mani, S. and Dhingra, T. (2012) 'Diffusion of innovation model of consumer behaviour – Ideas to accelerate adoption of renewable energy sources by consumer communities in India', *Renewable Energy*, 39, (1): 162-165.

Mansour, O. E. and Radford, S. K. (2016) 'Rethinking the environmental and experiential categories of sustainable building design: a conjoint analysis', *Building and Environment*, 98, 47-54.

Marschall-Lévesque, S., Castellanos-Ryan, N., Vitaro, F. and Séguin, J. R. (2014) 'Moderators of the association between peer and target adolescent substance use', *Addictive Behaviors*, 39, 48–70.

- Martinotti, G., Lupi, M., Carlucci, L., Cinosi, E., Santacroce, R., Acciavatti, T., Chillemi, E., Bonifaci, L., Janiri, L. and Di Giannantonio, M. (2015) 'Novel psychoactive substances: use and knowledge among adolescents and young adults in urban and rural areas', *Human Psychopharmacology: Clinical and Experimental*, 30, (4): 295-301.
- Matthews, A., Sutherland, R., Peacock, A., Van Buskirk, J., Whittaker, E., Burns, L. and Bruno, R. (2017) 'I like the old stuff better than the new stuff? Subjective experiences of new psychoactive substances', *International Journal of Drug Policy*, 40, 44-49.
- McAuley, A., Hecht, G., Barnsdale, L., Thomson, C. S., Graham, L., Priyadarshi, S. and Robertson, J. R. (2015) 'Mortality related to novel psychoactive substances in Scotland, 2012: An exploratory study', *International Journal of Drug Policy*, 26, 461-467.
- McElrath, K. and O'Neill, C. (2011) 'Experiences with mephedrone pre- and post-legislative controls: Perceptions of safety and sources of supply', *International Journal of Drug Policy*, 22, (2): 120-127.
- McElrath, K. and Van Hout, M-C. (2011) 'A Preference for Mephedrone: Drug Markets, Drugs of Choice, and the Emerging "Legal High" Scene', *Journal of Drug Issues*, 41, (4): 487-507.
- McQuarrie, E. F. (1989) 'The Impact of a Discontinuous Innovation: Outcomes Experienced by Owners of Home Computers', *Computers in Human Behavior*, 5, 227-240.
- Meade, N. and Islam, T. (2006) 'Modelling and forecasting the diffusion of innovation – A 25-year review', *International Journal of Forecasting*, 22, (3): 519-545.
- Measham, F., Moore, K., Newcombe, R. and Smith, Z. (2010) 'Tweaking, bombing, dabbing and stockpiling: the emergence of mephedrone and the perversity of prohibition', *Drugs and Alcohol Today*, 10, (1): 14-21.
- Measham, F., Moore, K. and Ostergaard, J. (2011) *Emerging Drug Trends in Lancashire: Night Time Economy Surveys. Phase One Report*, Department of Applied Social Science, Lancaster University.
- Measham, F. (2013) 'Social Issues in the Use of Novel Psychoactive Substances'. In: Dargan, P. and Wood, D. (Eds) *Novel Psychoactive Substances: Classification, Pharmacology and Toxicology*. Academic Press: London, pp 105-127.
- Measham, F. and Newcombe, R. (2016) 'What's so 'new' about new psychoactive substances? Definitions, Prevalence, Motivations, User Groups and A Proposed New Taxonomy'. In: T. Kolind, B. Thom and G. Hunt (Eds.) *The SAGE Handbook of Drug & Alcohol Studies: Social Science Approaches*. Sage Publications: Thousand Oaks, CA, pp 576-596.

- Meers, D., Macharis, C., Vermeiren, T. and van Lier, T. (2017) 'Modal choice preferences in short-distance hinterland container transport', *Research in Transportation Business & Management*, 23, 46–53.
- Miller, D. and Garnsey, E. (2000) 'Entrepreneurs and technology diffusion: How diffusion research can benefit from a greater understanding of entrepreneurship', *Technology in Society*, 22, 445–465.
- Miller, P. G., Johnston, J., McElwee, P. R. and Noble, R. (2007) 'A pilot study using the internet to study patterns of party drug use: processes, findings and limitations', *Drug and Alcohol Review*, 26, 169–174.
- Miller, P. G. and Sønderlund, A. L. (2010) 'Using the internet to research hidden populations of illicit drug users: a review', *Addiction*, 105, (9): 1557-67.
- Miller, B. L., Stogner, J. M., Agnich, L. E., Sanders, A., Bacot, J. and Felix, S. (2014) 'Marketing a Panic: Media Coverage of Novel Psychoactive Drugs (NPDs) and its Relationship with Legal Changes', *American Journal of Criminal Justice*, 40, 3, 523–541.
- Milner, F. M., Estabrooks, C. A. and Humphrey, C. (2005) 'Clinical nurse educators as agents for change: increasing research utilization', *International Journal of Nursing Studies*, 42, (8): 899-914.
- Miotto, K., Striebel, J., Cho, A. K. and Wang, C. (2013) 'Clinical and pharmacological aspects of bath salt use: A review of the literature and case reports', *Drug and Alcohol Dependence*, 132, (1-2): 1-12.
- Miron, J. A. (2003) 'The effect of drug prohibition on drug prices: Evidence from the markets for cocaine and heroin', *The Review of Economics and Statistics*, 85, 522–530.
- Moldovan, S., Steinhart, Y. and Ofen, S. (2015) "'Share and scare": Solving the communication dilemma of early adopters with a high need for uniqueness', *Journal of Consumer Psychology*, 25, (1): 1-14.
- Monaghan, M. (2014) 'Drug Policy Governance in the UK: lessons from changes to and debates concerning the classification of cannabis under the 1971 Misuse of Drugs Act', *International Journal of Drug Policy*, 25, (5): 1025-30.
- Moore, K., Dargan, P. I., Wood, D. M. and Measham, F. (2013) 'Do novel psychoactive substances displace established club drugs, supplement them or act as drugs of initiation? The relationship between mephedrone, ecstasy and cocaine', *European Addiction Research*, 19, (5): 276-82.
- Mounteney, J., Fry, C., McKeganey, N. and Haughland, S. (2010) 'Challenges of Reliability and Validity in the Identification and Monitoring of Emerging Drug Trends', *Substance Use & Misuse*, 45, 266–287.

- Mounteney, J., Giraudon, I., Denissov, G. and Griffiths, P. (2015) 'Fentanyls: Are we missing the signs? Highly potent and on the rise in Europe', *International Journal of Drug Policy*, 26, (7): 626-31.
- Mounteney, J., Griffiths, P., Sedefov, R., Noor, A., Vicente, J. and Simon, R. (2016) 'The drug situation in Europe: an overview of data available on illicit drugs and new psychoactive substances from European monitoring in 2015', *Addiction*, 111, (1): 34-48.
- Murguía, E., Tackett-Gibson, M., and Lessem, A. (2007) *Real drugs in a virtual world: Drug discourse and community online*, Lexington Books: Plymouth.
- Murphy, S., Waldorf, D. and Reinerman, C. (1990) 'Drifting into dealing: Becoming a cocaine seller', *Qualitative Sociology*, 13, (4): 321–343.
- National Assembly for Wales Health and Social Care Committee (2015) *Inquiry into New Psychoactive Substances*, National Assembly for Wales. Accessed January 2016. Available at: <http://www.assembly.wales/laid%20documents/cr-ld10147%20-%20report%20by%20the%20health%20and%20social%20care%20committee%20on%20the%20inquiry%20into%20new%20psychoactive%20substances/cr-ld10147-e.pdf>
- Natter, M. and Feurstein, M. (2002) 'Real world performance of choice-based conjoint models', *European Journal of Operational Research*, 137, 448-458.
- Nekola, M. and Moravek, J. (2015) 'Regulating New Psychoactive Substances in the Czech Republic: Policy Analysis under Urgency', *Journal of Comparative Policy Analysis: Research and Practice*, 17, (3): 229-246.
- Nelson, M. E., Bryant, S. M. and Aks, S. E. (2014) 'Emerging drugs of abuse', *Disease-a-Month*, 60, 110-132.
- The New Psychoactive Substances Review Expert Panel (2014) *New Psychoactive Substances Review: Report of the Expert Panel*, Home Office. Accessed April 2015. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/368583/NPSexpertReviewPanelReport.pdf.
- Nichols, D. E. and Fantegrossi, W. E. (2014) 'Emerging Designer Drugs'. In B. Madras and M. Kuhar (Eds.) *The Effects of Drug Abuse on the Human Nervous System*. Academic Press: Oxford, pp.575–596.
- Nicholson, T., Duncan, D. and White, J. (2002). 'Is recreational drug use normal?', *Journal of Substance Use*, 7.

- Nokelainen, T. and Dedehayir, O. (2015) 'Technological adoption and use after mass market displacement: The case of the LP record', *Technovation*, 36-37, 65-76.
- Nolan, M. L., Allen, B., Kunins, H. and Paone, D. (2016) 'A public health approach to increased synthetic cannabinoid-related morbidity among New York City residents, 2014-2015', *International Journal of Drug Policy*, 1-11.
- Nordin, S. M., Noor, S. M. and Saad, M. S. M. (2014) 'Innovation Diffusion of New Technologies in the Malaysian Paddy Fertilizer Industry', *Procedia - Social and Behavioral Sciences*, 109, 768-778.
- O'Brien, K., Chatwin, C., Jenkins, C. and Measham, F. (2014) 'New psychoactive substances and British drug policy: A view from the cyber-psychonauts', *Drugs: education, prevention, and policy*, 1-7.
- Orme, B. K. (2010) *Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research*, Research Publishers: Madison.
- Orsolini, L., Francesconi, G., Papanti, D., Giorgetti, A. and Schifano, F. (2015) 'Profiling online recreational/prescription drugs' customers and overview of drug vending virtual marketplaces', *Human Psychopharmacology: Clinical and Experimental*, 30, (4): 302-318.
- Palamar, J. J., Martins, S. S., Su, M. K. and Ompad, D. C. (2015) 'Self-reported use of novel psychoactive substances in a US nationally representative survey: Prevalence, correlates, and a call for new survey methods to prevent underreporting', *Drug and Alcohol Dependence*, 156, 112-9.
- Palamar, J. J., Acosta, P., Calderón, F. F., Sherman, S. and Cleland, C. M. (2017) 'Assessing self-reported use of new psychoactive substances: The impact of gate questions', *The American Journal of Drug and Alcohol Abuse*, 1-9.
- Park, C. S. (2013) 'Does Twitter motivate involvement in politics? Tweeting, opinion leadership, and political engagement', *Computers in Human Behavior*, 29, (4): 1641-1648.
- Paudyal, V., Hansford, D. Cunningham, S. and Stewart, D. (2013) 'Over-the-counter prescribing and pharmacists' adoption of new medicines: diffusion of innovations', *Research in Social and Administrative Pharmacy*, 9, (3): 251-62.
- Perrone, D., Helgesen, R. D. and Fischer, R. G. (2013) 'United States drug prohibition and legal highs: How drug testing may lead cannabis users to Spice', *Drugs: Education, Prevention and Policy*, 20, (3): 216-224.

- Pirona, A., Bo, A., Hedrich, D., Ferri, M., van Gelder, N., Giraudon, I., Montanari, L., Simon, R. and Mounteney, J. (2017) 'New psychoactive substances: Current health-related practices and challenges in responding to use and harms in Europe', *International Journal of Drug Policy*, 40, 84-92.
- Prosser, J. M. and Nelson, L. S. (2012) 'The toxicology of bath salts: a review of synthetic cathinones', *The Journal of Medical Toxicology*, 8, (1): 33-42.
- Prus, R. (1989) *Pursuing Customers: An Ethnography of Marketing Activities*, Sage Publications: California.
- Puska, P., Koskela, K., McAlister, A., Mayranen, H., Smolander, A., Moisio, S., Viri, L., Korpelainen, V. and Rogers, E. M. (1986) 'Use of lay opinion leaders to promote diffusion of health innovations in a community programme: lessons learned from the North Karelia project', *Bulletin of the World Health Organization*, 64, (3): 437-446.
- Ralphs, R., Williams, L., Askew, R. and Norton, A. (2016) 'Adding Spice to the Porridge: The development of a synthetic cannabinoid market in an English prison', *International Journal of Drug Policy*, 1-13.
- Ram, S. (1989) 'Successful Innovation Using Strategies to reduce Consumer Resistance: An Empirical Test', *Journal of Product Innovation Management*, 6, 20-34.
- Ramsey, J., Dargan, P. I., Smyllie, M., Davies, S., Button, J., Holt, D. W. and Wood, D. M. (2010) 'Buying 'legal' recreational drugs does not mean that you are not breaking the law', *QJM*, 103, (10): 777-83.
- Rao, N. and Svenkerud, P. J. (1998) 'Effective HIV/AIDS prevention communication strategies to reach culturally unique populations: Lessons learned in San Francisco, U.S.A. and Bangkok, Thailand', *International Journal of Intercultural Relations*, 22, (1): 85-105.
- Reardon, K. K. and Rogers, E. M. (1988) 'Interpersonal versus Mass Media Communication: A False Dichotomy', *Human Communication Research*, 15, (2): 284-303.
- Redmond, W. H. (2004) 'Interconnectivity in diffusion of innovations and market competition', *Journal of Business Research*, 57, (11): 1295-1302.
- Reuter, P. (2011) *Options for regulating new psychoactive drugs: A review of recent experiences*, UK Drug Policy Commission.
- Reuter, P. and Kleiman, M. A. (1986) 'Risks and prices: An economic analysis of drug enforcement', *Crime and Justice*, 289-340.
- Reuter, P. and Pardo, B. (2017) 'Can new psychoactive substances be regulated effectively? An assessment of the British Psychoactive Substances Bill', *Addiction*, 112, (1): 25-31.

- Robertson, T. S. (1967) 'The Process of Innovation and the Diffusion of Innovation', *Journal of Marketing*, 31, (1): 14-19.
- Roda, C., Angehrn, A., Nabeth, T. and Razmerita, L. (2003) 'Using conversational agents to support the adoption of knowledge sharing practices', *Interacting with Computers*, 15, 57–89.
- Rogers, E. M. (1962) *Diffusion of Innovations*, First Edition, Free Press of Glencoe: New York.
- Rogers, E. M. (1983) *Diffusion of Innovations*, Third Edition, The Free Press: New York, London.
- Rogers, E. M. (1995) 'Diffusion of Drug Abuse Prevention Programs: Spontaneous Diffusion, Agenda Setting, and Reinvention'. In: Backer, T. E. David, S. L. and Saucy, G. (eds) *Reviewing the Behavioral Science Knowledge Base on Technology Transfer*. National Institute on Drug Abuse, pp. 90-106.
- Rogers, E. M. (2002) 'Diffusion of preventive innovations', *Addictive Behaviours*, 27, (6): 989–993.
- Rogers, E. M. (2003) *Diffusion of Innovations*, Fifth Edition, Simon & Schuster International: New York.
- Rolles, S. and Kushlick, D. (2014) 'Prohibition is a key driver of the new psychoactive substances (NPS) phenomenon', *Addiction*, 109, 1587–1594.
- Rosenbaum, C. D., Carreiro, S. P. and Babu, K. M. (2012) 'Here today, gone tomorrow...and back again? A review of herbal marijuana alternatives (K2, Spice), synthetic cathinones (bath salts), kratom, Salvia divinorum, methoxetamine, and piperazines', *The Journal of Medical Toxicology*, 8, (1): 15-32.
- Ryan, R. M. and Deci, E. L. (2000) 'Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being', *American Psychologist*, 55, (1): 68–78.
- Rychert, M. and Wilkins, C. (2016) 'Legal high industry business and lobbying strategies under a legal market for new psychoactive substances (NPS, 'legal highs') in New Zealand', *International Journal of Drug Policy*, 37, 90-97.
- Sahin, I. (2006) 'Detailed Review of Rogers' Diffusion of Innovations Theory and educational technology-related studies based on Rogers' theory', *The Turkish Online Journal of Educational Technology*, 5, (2): 14-23.
- Sande, M. (2015) 'Characteristics of the use of 3-MMC and other new psychoactive drugs in Slovenia, and the perceived problems experienced by users', *International Journal of Drug Policy*, 1-9.

Santacroce, R., Corazza, O., Martinotti, G., Bersani, F. S., Valeriani, G. and Di Giannantonio, M. (2015) 'Psyclones: a roller coaster of life? Hidden synthetic cannabinoids and stimulants in apparently harmless products', *Human Psychopharmacology: Clinical and Experimental*, 30, (4): 265-271.

Sawtooth Software (2004) 'The CBC Latent Class Technical Paper (Version 3)', *Sawtooth Software Technical Paper Series*.

Sawtooth Software (2013) 'The CBC System for Choice-Based Conjoint Analysis', *Sawtooth Software Technical Paper Series*.

Scherer, C., Emberger-Klein, A. and Menrad, K. (2017) 'Biogenic product alternatives for children: Consumer preferences for a set of sand toys made of bio-based plastic', *Sustainable Production Consumption*, 10, 1-14.

Schifano, F., Corazza, O., Deluca, P., Davey, Z., Di Furia, L., Farre, M., Flesland, L., Mannonen, M., Pagani, S., Peltoniemi, T., Pezzolesi, C., Scherbaum, N., Siemann, H., Skutle, A., Torrens, M. and Van Der Kreeft, P. (2009) 'Psychoactive drug or mystical incense? Overview of the online available information on Spice products', *International Journal of Culture and Mental Health*, 2, (2): 137-144.

Schifano, F., Albanese, A., Fergus, S., Stair, J., Deluca, P., Corazza, O., Davey, Z., Corkery, J., Siemann, H., Scherbaum, N., Farre, M., Torrens, M., Demetrovics, Z. and Ghodse, A. H. (2011) 'Mephedrone (4-methylmethcathinone; 'meow meow'): chemical, pharmacological and clinical issues', *Psychopharmacology*, 214, (3): 593-602.

Seddon, T. (2014) 'Drug policy and global regulatory capitalism: the case of new psychoactive substances (NPS)', *International Journal of Drug Policy*, 25, (5): 1019-24.

Sedefov, R., Gallegos, A., Mounteney, J. and Kenny, P. (2013) 'Monitoring Novel Psychoactive Substances: A Global Perspective'. In: Dargan, P. and Wood, D. (Eds) *Novel Psychoactive Substances: Classification, Pharmacology and Toxicology*. Academic Press: London, pp 29-54.

Seebauer, S. (2015) 'Why early adopters engage in interpersonal diffusion of technological innovations: An empirical study on electric bicycles and electric scooters', *Transportation Research Part A: Policy and Practice*, 78, 146-160.

Seely, K. A., Patton, A. L., Moran, C. L., Womack, M. L., Prather, P. L., Fantegrossi, W. E., Radominska-Pandya, A., Endres, G. W., Channell, K. B., Smith, N. H., McCain, K. R., James, L.P. and Moran, J. H. (2013) 'Forensic investigation of K2, Spice, and "bath salt" commercial

preparations: A three-year study of new designer drug products containing synthetic cannabinoid, stimulant, and hallucinogenic compounds', *Forensic Science International*, 233, (1–3): 416-422.

Shanahan, M., Gerard, K. and Ritter, A. (2014) 'Preferences for policy options for cannabis in an Australian general population: A discrete choice experiment', *International Journal of Drug Policy*, 25, 682–690.

Sheridan, J. and Butler, R. (2010) "'They're legal so they're safe, right?" What did the legal status of BZP-party pills mean to young people in New Zealand?', *International Journal of Drug Policy*, 21, (1): 77-81.

Shimane, T., Wada, K., Hidaka, Y. and Funada, M. (2015) 'Prevalence and patterns of the use of novel psychoactive substances, "Kiken drugs", among younger adults at dance parties in Japan', *Drug and Alcohol Dependence*, 156, e183–e245.

Shu-Chu, S. L. (2014) 'Electronic newspaper and its adopters: examining the factors influencing the adoption of electronic newspapers in Taiwan', *Telematics and Informatics*, 20, 35–49.

Smith, S. W. and Garlich, F. M. (2013) 'Availability and Supply of Novel Psychoactive Substances'. In: P. Dargan and D. Wood (Eds) *Novel Psychoactive Substances: Classification, Pharmacology and Toxicology*. Academic Press: London, pp 55-77.

Smith, C. D. and Robert, S. (2014) "'Designer drugs': update on the management of novel psychoactive substance misuse in the acute care setting', *Clinical Medicine*, 14, (4): 409-415.

Smith, J. P., Sutcliffe, O. B. and Banks, C. E. (2015) 'An overview of recent developments in the analytical detection of new psychoactive substances (NPSs)', *Analyst*, 140, (15): 4932-4948.

Smith, S. M., Gewandter, J. S., Kitt, R. A., Markman, J. D., Vaughan, J. A., Cowan, P., Kopecky, E. A., Malamut, R., Sadosky, A., Tive, L., Turk, D. C. and Dworkin, R. H. (2016) 'Participant Preferences for Pharmacologic Chronic Pain Treatment Trial Characteristics: An ACTION Adaptive Choice-Based Conjoint Study', *The Journal of Pain*, 17, (11): 1198-1206.

Smyth, B. P., Lyons, S. and Cullen, W. (2017) 'Decline in new psychoactive substance use disorders following legislation targeting headshops: Evidence from national addiction treatment data', *Drug and Alcohol Review*, 1-9.

Sobell, L. C. (2016) 'Bridging the Gap Between Scientists and Practitioners: The Challenge Before Us – Republished Article', *Behavior Therapy*, 297-320.

Song, J. (2014) 'Understanding the adoption of mobile innovation in China', *Computers in Human Behavior*, 38, 339-348.

- Soussan, C. and Kjellgren, A. (2014) 'The flip side of "Spice": The adverse effects of synthetic cannabinoids as discussed on a Swedish Internet forum', *Nordic Studies on Alcohol and Drugs*, 31, 207-220.
- Soussan, C. and Kjellgren, A. (2016) 'The users of Novel Psychoactive Substances: online survey about the characteristics, attitudes and motivations', *International Journal of Drug Policy*, 32, 77-84.
- Soussan, C., Andersson, M. and Kjellgren, A. (2018) 'The diverse reasons for using Novel Psychoactive Substances - A qualitative study of the users' own perspectives', *International Journal of Drug Policy*, 52, 71-78.
- Stephenson, G. and Richardson, A. (2014) *New Psychoactive Substances in England: A review of the evidence*, Crime and Policy Analysis Unit, Home Office Science.
- Stevens, A. and Measham, F. (2014) 'The 'drug policy ratchet': why do sanctions for new psychoactive drugs typically only go up?', *Addiction*, 109, (8): 1226-32.
- Stevens, A., Fortson, R., Measham, F. and Sumnall, H. (2015) 'Legally flawed, scientifically problematic, potentially harmful: The UK Psychoactive Substance Bill', *International Journal of Drug Policy*, 26, (12): 1167-1170.
- Stogner, J. M. (2015) 'Predictions instead of panics: the framework and utility of systematic forecasting of novel psychoactive drug trends', *The American Journal of Drug and Alcohol Abuse*, 1-8.
- Stogner, J., Khey, D. N., Griffin, O. H., Miller, B. L. and Boman, J. H. (2012) 'Regulating a novel drug: An evaluation of changes in use of *Salvia divinorum* in the first year of Florida's ban', *International Journal of Drug Policy*, 23, (6): 512-521.
- Stogner, J. M. and Miller, B. L. (2013) 'Investigating the 'bath salt' panic: the rarity of synthetic cathinone use among students in the United States', *Drug and Alcohol Review*, 32, (5): 545-9.
- Stogner, J. M. and Miller, B. L. (2014) 'A spicy kind of high: a profile of synthetic cannabinoid users', *Journal of Substance Use*, 19, (1-2): 199-205.
- Sumnall, H. R., Evans-Brown, M. and McVeigh, J. (2011) 'Social, policy, and public health perspectives on new psychoactive substances', *Drug Testing and Analysis*, 3, (7-8): 515-23.
- Sumnall, H., McVeigh, J. and Evans-Brown, M. J. (2013) 'Epidemiology of Use of Novel Psychoactive Substances'. In: P. Dargan and D. Wood (Eds.) *Novel Psychoactive Substances: Classification, Pharmacology and Toxicology*. Academic Press: London, pp 79-103.

Sundstrom, B. (2014) 'Breaking Women's Health Taboos: Integrating Diffusion of Innovations Theory With Social Marketing', *Social Marketing Quarterly*, 20, (2): 87-102.

Sutherland, R., Peacock, A., Whittaker, E., Roxburgh, A., Lenton, S., Matthews, A., Butler, K., Nelson, M., Burns, L. and Bruno, R. (2016) 'New Psychoactive Substance Use among Regular Psychostimulant Users in Australia, 2010-2015', *Drug and Alcohol Dependence*, 1-24.

Sutherland, R., Bruno, R., Peacock, A., Dietze, P., Breen, C., Burns, L. and Barratt, M. J. (2017) 'New psychoactive substances: Purchasing and supply patterns in Australia', *Human Psychopharmacology*, 1-8.

Tackett-Gibson, M. (2008) 'Constructions of Risk and Harm in Online Discussions of Ketamine Use', *Addiction Research & Theory*, 16, (3): 245-257.

Tein, J. Y., Coxe, S. and Cham, H. (2013) 'Statistical Power to Detect the Correct Number of Classes in Latent Profile Analysis', *Structural equation modeling: a multidisciplinary journal*, 20, (4): 640-657.

Tilley, L. and Woodthorpe, K. (2011) 'Is it the end for anonymity as we know it? A critical examination of the ethical principle of anonymity in the context of 21st century demands on the qualitative researcher', *Qualitative Research*, 11, 197-212.

Tola, A. and Contini, M. V. (2015) 'From the Diffusion of Innovation to Tech Parks, Business Incubators as a Model of Economic Development: The Case of "Sardegna Ricerche"', *Procedia - Social and Behavioral Sciences*, 176, 494-503.

Tracy, D. K., Wood, D. M. and Baumeister, D. (2017) 'Novel psychoactive substances: types, mechanisms of action, and effects', *BMJ*, 356.

Tsang, A. S. L. and Zhou, N. (2005) 'Newsgroup participants as opinion leaders and seekers in online and offline communication environments', *Journal of Business Research*, 58, 1186-1193.

UNODC (2013) *World Drug Report*, UNODC: Vienna.

UNODC (2014) *Global Synthetic Drugs Assessment*, UNODC: Vienna.

UNODC (2015) *World Drug Report*, UNODC: Vienna.

UNODC (2016) *World Drug Report*, UNODC: Vienna.

Utz, K. S., Hoog, J., Wentrup, A. Berg, S., Lämmer, A., Jainsch, B., Waschbisch, A., De-Hyung, L., Linker, R. A. and Schenk, T. (2014) 'Patient preferences for disease-modifying drugs in multiple sclerosis therapy: a choice-based conjoint analysis', *Therapeutic Advances in Neurological Disorders*, 7, (6): 263-275.

- Valeriani, G., Corazza, O., Bersani, F. S., Melcore, C., Metastasio, A., Bersani, G. and Schifano, F. (2015) 'Olanzapine as the ideal "trip terminator"? Analysis of online reports relating to antipsychotics' use and misuse following occurrence of novel psychoactive substance-related psychotic symptoms', *Human Psychopharmacology: Clinical and Experimental*, 30, (4): 249-254.
- Van Amsterdam, J., Nutt, D. and Van den Brink, W. (2013) 'Generic legislation of new psychoactive drugs', *The Journal of Psychopharmacology*, 27, 317–324.
- Van Amsterdam, J. G., Nabben, T., Keiman, D., Haanschoten, G. and Korf, D. (2015) 'Exploring the Attractiveness of New Psychoactive Substances (NPS) among Experienced Drug Users', *Journal of Psychoactive Drugs*, 1-5.
- Van Heek, J., Arning, K. and Ziefle, M. (2017) 'Reduce, reuse, recycle: Acceptance of CO₂-utilization for plastic products', *Energy Policy*, 105, 53–66.
- Van Hout, M-C. (2014) 'An Internet Study of User's Experiences of the Synthetic Cathinone 4-Methylethcathinone (4-MEC)', *Journal of Psychoactive Drugs*, 46, (4): 273-86.
- Van Hout, M-C. and Brennan, R. (2011) "'Heads held high': an exploratory study of legal highs in pre-legislation Ireland", *Journal of Ethnicity in Substance Abuse*, 10, (3): 256-72.
- Van Hout, M-C. and Bingham, T. (2012) "'A Costly Turn On': Patterns of use and perceived consequences of mephedrone based head shop products amongst Irish injectors", *International Journal of Drug Policy*, 23, 188–197.
- Van Hout, M-C. and Hearne, E. (2015) "'Word of mouse': indigenous harm reduction and online consumerism of the synthetic compound methoxphenidine", *Journal of Psychoactive Drugs*, 47, (1): 30-41.
- Van Hout, M-C. and Hearne, E. (2017) 'New psychoactive substances (NPS) on cryptomarket fora: An exploratory study of characteristics of forum activity between NPS buyers and vendors', *International Journal of Drug Policy*, 40, 102-110.
- Van Rijnsoever, F. J., Van Hameren, D., Walraven, P. F. G. and Van Dijk, J. P. (2009) 'Interdependent technology attributes and the diffusion of consumer electronics', *Telematics and Informatics*, 26, (4): 410-420.
- Vandrey, R., Dunn, K. E., Fry, J. A. and Girling, E. R. (2012) 'A survey study to characterize use of Spice products (synthetic cannabinoids)', *Drug and Alcohol Dependence*, 120, (1-3): 238-41.
- Vandrey, R., Johnson, M. W., Johnson, P. S. and Khalil, M. A. (2013) 'Novel Drugs of Abuse: A Snapshot of an Evolving Marketplace', *Adolescent psychiatry*, 3, (2): 123–134.

- Vardakou, I., Pistos, C. and Spiliopoulou, C. (2011) 'Drugs for youth via Internet and the example of mephedrone', *Toxicology Letters*, 201, (3): 191-5.
- Vento, A. E., Martinotti, G., Cinosi, E., Lupi, M., Acciavatti, T., Carrus, D., Santacroce, R., Chillemi, E., Bonifaci, L., di Giannantonio, M., Corazza, O. and Schifano, F. (2014) 'Substance use in the club scene of Rome: a pilot study', *BioMed Research International*, 2014, 1-6.
- Vermette-Marcotte, A-E., Dargan, P. I., Archer, J. R. H., Gosselin, S. and Wood, D. M. (2014) 'An Internet snapshot study to compare the international availability of the novel psychoactive substance methiopropamine', *Clinical Toxicology*, 52, (7): 678-681.
- Vogels, N., Brunt, T. M., Rigter, S., van Dijk, P., Vervaeke, H. and Niesink, R. J. (2009) 'Content of ecstasy in the Netherlands: 1993-2008', *Addiction*, 104, (12): 2057-66.
- Voleti, S., Srinivasan, V. and Ghosh, P. (2017) 'An approach to improve the predictive power of choice-based conjoint analysis', *International Journal of Research in Marketing*, 34, 325-335.
- Vollink, T., Meertens, R. E. E. and Midden, C. J. H. (2002) 'Innovating 'Diffusion of Innovation' Theory: Innovation Characteristics and the Intention of Utility Companies to Adopt Energy Conservation Interventions', *Journal of Environmental Psychology*, 22, (4): 333-344.
- Vreeker, A., Van der Burg, B. G., Van Laar, M. and Brunt, T. M. (2017) 'Characterizing users of new psychoactive substances using psychometric scales for risk-related behavior', *Addictive Behaviors*, 70, 72-78.
- Wagner, K. D., Armenta, R. F., Roth, A. M., Maxwell, J. C., Cuevas-Mota, J. and Garfein, R. S. (2014) 'Use of synthetic cathinones and cannabimimetics among injection drug users in San Diego, California', *Drug and Alcohol Dependence*, 141, 99-106.
- Wagner Weick, C. and Walchli, S. B. (2002) 'Genetically engineered crops and foods: back to the basics of technology diffusion', *Technology in Society*, 24, 265-283.
- Walsh, C. (2016) 'Psychedelics and cognitive liberty: Reimagining drug policy through the prism of human rights', *International Journal of Drug Policy*, 29, 80-87.
- Ward, R. (2013) 'The application of technology acceptance and diffusion of innovation models in healthcare informatics', *Health Policy and Technology*, 2, (4): 222-228.
- Weaver, M. F., Hopper, J. A. and Gunderson, E. W. (2015) 'Designer drugs 2015: assessment and management', *Addiction Science and Clinical Practice*, 10, 8: 1-9.
- Wei, L. and Zhang, M. (2008) 'The adoption and use of mobile phone in rural China: A case study of Hubei, China', *Telematics and Informatics*, 25, (3): 169-186.

- Werse, B. and Morgenstern, C. (2012) 'How to handle legal highs? Findings from a German online survey and considerations on drug policy issues', *Drugs and Alcohol Today*, 12, (4): 222-231.
- Wilkins, C. and Sweetsur, P. (2013) 'The impact of the prohibition of benzylpiperazine (BZP) "legal highs" on the availability, price and strength of BZP in New Zealand', *Drug and Alcohol dependence*, 144, 47-52.
- Wilkins, C., Parker, K., Prasad, J., and Jawalkar, S. (2016) 'Do police arrestees substitute legal highs for other drugs?', *International Journal of Drug Policy*, 31, 74-9.
- Winstock, A. and Ramsey, J. (2010) 'Legal highs and the challenges for policy makers', *Addiction*, 105, (10): 1685–1687.
- Winstock, A., Mitcheson, L. and Marsden, J. (2010a) 'Mephedrone: still available and twice the price', *The Lancet*, 376, (9752): 1537.
- Winstock, A., Mitcheson, L., Deluca, P., Davey, Z., Corazza, O. and Schifano, F. (2010b) 'Mephedrone, new kid for the chop?', *Addiction*, 106, 154–161.
- Winstock, A., Mitcheson, L., Ramsey, J., Davies, S., Puchnarewicz, M. and Marsden, J. (2011) 'Mephedrone: use, subjective effects and health risks', *Addiction*, 106, (11): 1991-6.
- Winstock, A. R. and Barratt, M. J. (2013) 'Synthetic cannabis: A comparison of patterns of use and effect profile with natural cannabis in a large global sample', *Drug and Alcohol Dependence*, 1–2, 106-111.
- Wood, D. M. and Dargan, P. I. (2012) 'Mephedrone (4-methylmethcathinone): What is new in our understanding of its use and toxicity', *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 39, (2): 227-233.
- Wood, D. M., Hunter, L., Measham, F. and Dargan, P. I. (2012) 'Limited use of novel psychoactive substances in South London nightclubs', *QJM*, 105, (10): 959-64.
- Wood, D. M., Ceronie, B. and Dargan, P. I. (2016) 'Healthcare professionals are less confident in managing acute toxicity related to the use of new psychoactive substances (NPS) compared with classical recreational drugs', *QJM*, 109, (8): 527.
- Yamamoto, Y. (2015) 'Opinion leadership and willingness to pay for residential photovoltaic systems', *Energy Policy*, 83, 185-192.
- Young, M. M., Dubeau, C. and Corazza, O. (2015) 'Detecting a signal in the noise: monitoring the global spread of novel psychoactive substances using media and other open-source information', *Human Psychopharmacology: Clinical and Experimental*, 30, (4): 319-326.

Zaunbrecher, B. S., Linzenich, A. and Ziefle, M. (2017) 'A mast is a mast is a mast...? Comparison of preferences for location scenarios of electricity pylons and wind power plants using conjoint analysis', *Energy Policy*, 105, 429–439.

Zawilska, J. B. and Andrzejczak, D. (2015) 'Next generation of novel psychoactive substances on the horizon—a complex problem to face', *Drug and Alcohol Dependence*, 1, (157):1-17.

Zawilska, J. B. and Wojcieszak, J. (2013) 'Designer cathinones—An emerging class of novel recreational drugs', *Forensic Science International*, 231, (1–3): 42-53.

Zolkepli, I. A. and Kamarulzaman, Y. (2015) 'Social media adoption: The role of media needs and innovation characteristics', *Computers in Human Behavior*, 43, 189-209.

Żukiewicz-Sobczak, W., Zwoliński, J., Chmielewska-Badora, J., Krasowska, E., Piątek, J., Sobczak, P., Wojtyła, A., Fornal, E., Kuczumow, A. and Biliński, P. (2012) 'Analysis of psychoactive and intoxicating substances in legal highs', *Annals of Agricultural and Environmental Medicine*, 19, (2): 309-314.

Websites

Public Health England (2018). Accessed January 2018. Available at: <https://report-illicit-drug-reaction.phe.gov.uk/>

Appendices

Appendix 1: Study One

Stage One Table

Innovation Itself

	Relative Advantage	Compatibility	Complexity
Characteristics	Def: Innovation is technically superior/ 'better'/ improvement (in terms of cost, functionality, "image", etc.) than technology it supersedes/ its alternatives/ current ideas/technology.	Def: Degree to which an innovation is perceived as consistent with existing values, past experiences, life style and needs of potential adopters.	Def: Degree to which a certain innovation is difficult to understand and use.
Economic	<ul style="list-style-type: none"> • Convenience, satisfaction. • Economic profitability- cost reduction, time saving, low perceived risk, low initial cost. • Increased effectiveness/ efficiency. • Saving of time and/or effort. • Immediate benefits. • Anticipated benefits/ expected outcomes/ judgments of predicted outcomes, both tangible and intangible. • Uncertainty decreases when participants weight benefits of technology against costs of adoption and perceive low risk and high benefit. 	<ul style="list-style-type: none"> • When innovation is more compatible, uncertainty will decrease- leads users to utilize innovations correctly. 	<ul style="list-style-type: none"> • Should be perceived by potential users as easy – otherwise barrier for adoption behaviour. • Technology itself may not be perceived as difficult to understand, but learning how to effectively apply it can be. • High- complexity products- people often value novel attributes negatively because of anticipated high learning costs involved.

<p>Social</p>	<ul style="list-style-type: none"> • Ecological or health benefits. • Social prestige- influence perception/ hedonistic benefits. • Before adopting analyse what specific relative advantages are important to them. • Nature of innovation determines type of relative advantage that is important to adopter. • Objective advantage may not matter- individual needs to perceive innovation as being advantageous. • Can convey almost anything. • Possibly previously never existed but meets recognised need. 	<ul style="list-style-type: none"> • Compatible with existing needs, ideas, skills, and work practices of potential adopters. • Consistent with beliefs and philosophy. • Consistent with potential adopter's characteristics/ personality. • 3 dimensions: existing values (e.g. sociocultural values and beliefs), past experiences (e.g. previously introduced ideas), and the needs of potential adopters. • Perceived “fit” of innovation. • Compatibility give meaning to new idea- regarded as being more familiar. • Innovation name should be meaningful to potential adopter. 	
<p>Identity</p>			<ul style="list-style-type: none"> • May signal higher quality- could signal newness and advancement. Complexity functions as a ‘trigger of interest’ for adoption intention but becomes a barrier for behaviour. • User innovation communities must help reduce complexity of

			<p>innovation for adopting organisation.</p> <ul style="list-style-type: none"> • Involves both usability (easy or difficult to use) and comprehension (easy or difficult to understand), but the two can be viewed as separate in mind of potential adopters. • Technology may be simple to understand (online banking) but difficult or inconvenient to use (no internet access).
--	--	--	---

	Trialability	Observability
Characteristics	<ul style="list-style-type: none"> • Def: Innovation can be experimented with on trial basis without undue effort/expense; can be implemented incrementally and still provide a net positive benefit. 	<ul style="list-style-type: none"> • Def: Results/ impacts and benefits of innovation`s use can be easily observed and communicated to others/ potential users.
Economic	<ul style="list-style-type: none"> • Helps potential adopter assess extent of behavioral change required when adopting innovation. • Allows experimentation/ testing for cost before committing to adoption. • Can be experimented on a limited basis without major investment of time/ resources. 	<ul style="list-style-type: none"> • High degree of observability- relatively easy to learn about it and judge its potential benefits.
Social	<ul style="list-style-type: none"> • If able to try out/ observe product- can make judgment of its trialability & observability. • Enables consumer to see how innovation works. 	<ul style="list-style-type: none"> • Some ideas are difficult to observe or to describe to others.

Identity		<ul style="list-style-type: none"> • Visibility stimulates peer discussion of a new idea- request evaluation information concerning innovation. • Results of innovation can be diffused to other members of a group via formal and informal networks. • Ease to which technology can be observed, imagined, or described to potential user. • Both how observable promotion of service was, and how its use was observed. • Higher desirability likely to stimulate the consumer's intention to adopt. • When you can see positive results of an innovation adopted by someone else, you will be more likely to adopt it yourself. • Potential adopter can see others using technology- ability to vicariously evaluate it/ acknowledge benefits.
-----------------	--	--

Communication Channels

	Interpersonal Channel	Mass Media
Characteristics	<ul style="list-style-type: none"> • Def: Extent to which members from one's social network influence him/her to use an innovation. • Dominant mechanism for facilitating diffusion. • Role of persuasion- more effective in promoting behavioural change. • More effective in forming/changing attitudes to new idea - influencing decision to adopt/ reject. • In persuasion, adoption, and implementation stages, more interpersonal interactions needed to provide information, training, and support. • Diffusion process require overcoming 'scepticism' and being persuaded to change their 'attitudes' - role of informal, interpersonal communication channels is key. 	<ul style="list-style-type: none"> • Def: salesmen, campaigns, targeted literature make individuals aware of innovations. • EG: Newspapers, radio broadcasts, and television. • Role/ power to inform- power to persuade weaker than interpersonal channels. • Important in knowledge phase - introduce innovation/ disseminate initial knowledge to community. • Effect of mass media use is strong in early stages of the adoption process

	<ul style="list-style-type: none"> • Provide information that might have been missed, legitimation and support. • Provide informal trial use of innovation such as knowledge of experiences of peer- information based on experience is more effective in facilitating adoption. • Communication between adopters and also non-verbal observability of adoptions can induce peer-effects - decision of potential adopters may be influenced by previous adopters. • More powerful than mass media in convincing social system to accept new innovation. • Information obtained from peers tends to have more credibility than information from objective sources. • Average person likely to be affected more by social pressures, group associations, and attitudes of opinion leaders they know than by mass media - want to create/ preserve positive social image within social group. • Increased group activity increases interpersonal communication and visibility of product. • Interpersonal communication channels vary in degree of influence over technology adoption, based on degree of trust held by the adopter in the channel, and channel's perceived level of expertise. • Innovation tends to be introduced to community from outside source, dissemination and adoption of it typically occurs through interpersonal communication networks. • Usually more effective when high degree of professional resemblance/ are significant to adopter from individual attempting to introduce innovation. • Typically characterized by homophily. 	<ul style="list-style-type: none"> • Broadcast information to wide range of people - allow source of one/ few to quickly reach audience of many. • Common but costly for spreading information. • Increase public awareness and provide facts that can lead to increased knowledge. • Knowledge is disembodied, impersonal and context-free. • Using print media or affiliated agents to disseminate favorable information about product performance or about favorable response to concept from other customers seemed to reduce the amount of resistance to innovation. • Early adopters tend to use more types of mass media more frequently than late adopters. • Almost all mass media channels are cosmopolite. • Increasingly blurred boundaries between mass media and interpersonal channels – internet.
--	---	---

	Homophily	Heterophily
Characteristics	<ul style="list-style-type: none"> • Def: extent to which two or more individuals who interact/ communicate are similar in certain attributes, education and social status. • People who share similar activities, tastes, risk aversion and beliefs. • Uniformity of the participants affects effectiveness of communication. • Interpersonal channels related to diffusion are typically characterized by homophily. • In studies of social networks, people with similar attributes tend to interact together. • Too much homophily in a social system means that elite individuals (most likely to be early adopters) will interact only with each other. • Interpersonal similarity within homophilous networks breeds both more communication and more effective communication. • Individuals may feel more comfortable sharing new information with others perceived as similar to them – fosters trust and reciprocity. • May limit diffusion beyond a particular group. • Plays large role in relationship building. • Exerts significant influence on online information exchange and evaluation of information. • Social media users connect with others who have similar characteristics in terms of demographics, attitudes, and informational interests- lead to interactions in which information exchange occurs. • Crucial to social movements, collective actions, social changes, and cultural formations. • Leads to effective communication about the technology - assumption that members of the group are similarly well informed. 	<ul style="list-style-type: none"> • Def: when individuals differ regarding education level, experience, beliefs, and social/ socioeconomic status. • Innovators of technology tend toward heterophily with majority of potential adopters because they have more technological literacy than later adopters. • Individual adopters are often heterophilous. This makes it difficult for an actor attempting to diffuse an innovation to choose only one single approach. • Rogers: if individuals wish to improve their reception of information, they need ‘to break out of the comfort of close links and form more heterophilous and spatially distant network links’.

Time

	Innovators	Early Adopters
Characteristics	<ul style="list-style-type: none"> • Initiate diffusion process 	<ul style="list-style-type: none"> • Key to diffusion/ Increase confidence/ Are observed
Economic	<ul style="list-style-type: none"> • Higher incomes • Cope better with uncertainty/ Resources to absorb setbacks 	<ul style="list-style-type: none"> • Higher income levels
Social	<ul style="list-style-type: none"> • Higher social status • More education/well educated • More technological knowledge/literacy • Have contacts regionally/globally • Closest contact with scientific sources 	<ul style="list-style-type: none"> • Higher social status • Higher education • Extensive interpersonal communication channels/ 'connectors'/ more social participation/ well-connected • 'Individual to check with' before adopting/ Encourage others/ decrease uncertainty • Greater knowledge/ technical competences • Opinion leaders/ Social leaders/ High social influence/ Good reputation. • Homophilous with larger population • More likely to be specialists • In touch with latest advances • Likely to have friends and contacts from different countries. • Engage actively in discussing product features, instigating trial behaviour and recommending purchase. • Equally direct diffusion efforts to immediate social network and strangers.
Identity	<ul style="list-style-type: none"> • Interest in new ideas/actively sought out • More creative • Risk takers/ Adventurous/ Pioneers • Venturesomeness as an obsession 	<ul style="list-style-type: none"> • Not bound by tradition/ do not fear change • Innovative/ Risk takers • Younger/ Liberal/ Cosmopolitan • Influenced by psychological factors: image/ status-motivated. • Favourable attitude toward science/ technology.

	<ul style="list-style-type: none"> • Deviators/May not be respected • Uniqueness seeking 	
--	--	--

	Early Majority	Late Majority	Laggards
Characteristics	<ul style="list-style-type: none"> • Adopt before average 	<ul style="list-style-type: none"> • Adopt new ideas later than average/ wait to adopt 	<ul style="list-style-type: none"> • Resist adopting until absolutely necessary/ strong evidence/ coercion
Economic		<ul style="list-style-type: none"> • Economically conscious 	<ul style="list-style-type: none"> • Do not have financial/ emotional resources necessary to adopt
Social	<ul style="list-style-type: none"> • Above average socioeconomic status • Above average educational level • Not opinion leaders/ leadership positions • Good interaction with other members of social system, • Adopt innovation just before other half of peers adopt. 	<ul style="list-style-type: none"> • Low status • Decide to adopt based on what others have done 	<ul style="list-style-type: none"> • Lowest socioeconomic status • Adopt when product about to be removed from market • Less knowledge/ experience with innovation • Little social interaction/ withdrawn • Least exposure to mass media or interpersonal communication channels. • Most localized group of the social system. • Their small interpersonal channels mainly consist of other laggards.

Identity	<ul style="list-style-type: none"> • Deliberate before completely adopting • Relatively positive attitude towards innovation but need time • More status-motivated for adopting innovations. • Typical community members. 	<ul style="list-style-type: none"> • Sceptical about value of innovation • Need encouragement/ economic/ peer pressure • Adopt when low risks/ Cautious • Perceive status as less significant. • Typical community members. 	<ul style="list-style-type: none"> • Focused on traditions/ conservative • Highly sceptical/ suspicious • Most patient/ cautious/ risk-averse • Perceive status as less significant. • Disinterest in technology as a whole rather than their confidence in using it unaided.
-----------------	---	--	--

Social System

	Change Agents	Opinion Leaders
Characteristics	<ul style="list-style-type: none"> • Influences clients' innovation-decisions in direction deemed desirable by change agency. 	<ul style="list-style-type: none"> • Def of Leadership: degree to which an individual is able to influence other individuals' attitudes/overt behaviour informally in a desired way with relative frequency.
Economic		<ul style="list-style-type: none"> • If project is insufficiently appealing (clarity of goals, organisation, and resources), it will not attract support of key opinion leaders.
Social	<ul style="list-style-type: none"> • Act as opinion leaders/ Target opinion leaders. • Higher degree of external communication/ accessibility/ social participation/ innovativeness. • Need to possess high level of knowledge. 	<ul style="list-style-type: none"> • First to learn about new ideas/ stimulate others to adopt. • Greater number of outside the group contacts. • Greatest influence/ Influence with professional knowledge. • Respected status/ authority/ reputation of competence obtained from earlier events and interactions.

<p>Identity</p>	<ul style="list-style-type: none"> • Understand importance of interpersonal communication in facilitating/ inhibiting adoption. • More success if member of group. • Provide information regarding benefits/ risks of innovations. • Need to be trained/ supported to develop strong interpersonal relationships with potential users and to explore/ empathize with user's perspective. • External change agents: need to be encouraged to communicate users' needs and perspective to developers of innovation. • May provide technical assistance to implementers. • Must possess good analytic/ communication skills- to gain people's confidence. • Selected for their homophily and credibility with potential users of innovation. • Eg: Competitors, B2B vendors, suppliers and customers. 	<ul style="list-style-type: none"> • Higher socioeconomic status/ education. • Must be socially accessible. • Influence other people's choices through various communication channels- personal and media. • Established through providing suggestions/ advice on products/ services in online context. • Pro-actively pass along product information and try to influence others' consumer decisions raising awareness, addressing misconceptions, and offering trial runs. • When social system's norms favour change, opinion leaders are more innovative, but when system's norms do not, opinion leaders are not especially innovative. • Have expert power – technically competent/ convincing. • Expertise to external sources of knowledge/ experience to provide information/ advice • Tend to conform to system norms- not innovators. • Own contemporary models of a product.
------------------------	---	--

Appendix 2: Study Two

Study Two Table of Interviewees

Profession	Gender	Country	Date	Method
Retailer 1	Male	United Kingdom	22/03/2016	Questions Sent
Retailer 2	Male	United Kingdom	13/07/2016	Skype
Retailer 3	Male	United Kingdom	27/03/2016	Telephone

Study Two Participant Information Sheet



LIVERPOOL JOHN MOORES UNIVERSITY

Diffusion of New Psychoactive Substances: understanding population motives, harms and intervention needs.

Lucy Wallis

Centre for Public Health

You are being invited to take part in a research study. Before you decide whether to take part, it is important that you understand why the research is being done and what it involves. Please take time to read the following information and please ask me if there is anything that is not clear or if you would like further information.

What is the purpose of the study?

You are being asked to take part in a research study that is exploring the diffusion of new psychoactive substances (NPS) in the United Kingdom. This research will investigate why different new psychoactive substances (NPS) diffuse and others fail to do so and the role of current legislation on NPS. Diffusion relates to the process through which an innovation (an NPS) is communicated through communication channels (interpersonal or the media) over time and the extent to which widespread use amongst a social system is achieved. Vendors/retailers perspectives are often ignored within the wider debate around NPS and this research aims to voice their experiences and opinions as much needed valuable contributions. The interview will form a part of a PhD study.

Do I have to take part?

It is your decision whether you take part or not. If you do, you will be asked to sign a consent form, or if the interview is carried out over the telephone you will be asked to verbally confirm your consent. You are free to withdraw at any time during the interview and without providing a reason. If you are not comfortable answering a question then please tell me and I will move onto the next question.

What will happen to me if I take part?

If you decide to take part a suitable time for an interview will be arranged. The interview will be conducted either over the telephone or in person, in a place which is convenient for you.

At the start of the interview, I will explain the study to you and if you agree to take part you will be asked to sign a consent form or provide your consent verbally in the case of a telephone interview. During the conversation I will ask about your perception of the reasons for the diffusion of different NPS and why people are choosing to access and use the products. We will also discuss more generally NPS retailing practices and your opinions on current legislation around NPS. The interview will last for approximately one hour.

Are there any risks / benefits involved?

The research is confidential and independent and no risks are envisaged. You will not be pressured to answer questions you do not wish to.

Will my taking part in the study be kept confidential?

All the information that you provide will remain confidential. With your permission, the interview will be recorded. The recording will not be shared with anyone else and a copy of it will be saved on a password protected computer. After the interview has been transcribed the original recording will be deleted (a copy of it will remain on the password protected computer until the study has finished). Quotations from the interview may be used in the write up of the research report, but they will be anonymised.

Contact Details

If you have any questions or would like to discuss the study, please contact any of the researchers using the information provided below:

Lucy Wallis – PhD Student

L.A.Wallis@2015.ljmu.ac.uk

Supervisors

Prof Harry Sumnall

H.Sumnall@ljmu.ac.uk

Amanda Atkinson

a.m.atkinson@ljmu.ac.uk

Ms Judith Aldridge

judith.aldridge@manchester.ac.uk

Centre for Public Health

Liverpool John Moores University

Henry Cotton Campus

15-21 Webster Street

Liverpool

L3 2ET

If you any concerns regarding your involvement in this research, please discuss these with the researcher in the first instance. If you wish to make a complaint, please contact researchethics@ljmu.ac.uk and your communication will be re-directed to an independent person as appropriate.

Study Two Interview Guide

Introductory Questions

1. What is your age and sex?
2. How would you describe your activity in relation to NPS?
3. How long have you been doing this activity for?
4. How did you become involved? And what were you doing before?
5. Can you describe your website? <i>In terms of design, platform, registration country, payments, history of online retail, changing identity.</i>
6. Who is your target audience?

General NPS Questions

1. <i>The World Drug Report states that 95 countries have reported NPS and the number of NPS products currently being monitored by the EMCDDA is more than 450. Do you think NPS products have become more popular in recent years? If so why?</i>
How important has the internet been in the growth of the NPS market?
2. <i>How would you compare the use of NPS to other more traditional illegal drugs? In terms of use patterns, harms, user groups, prevalence, substitution, complementarity.</i>

Reasons for different NPS use in general

1. <i>Common reasons users give for their use of NPS relate to their legality, price, lack of detection in drug tests, and ease of access. Why do you think people choose to use NPS products?</i>
2. <i>How do you think individuals select an NPS product, what characteristics do you think they are looking for?</i>

3. In contrast, what characteristics do you think retailers prioritize? Are these always the same as users?
4. What role do you think the following attributes play in choosing an NPS product:
○ Price
○ Legality
○ Purity
○ Psychopharmacological effects
○ Lack of detection in drug tests
○ Accessibility
5. Is the similarity, in terms of psychopharmacological effects, between an NPS product and its assumed illegal substitute important?

Retailing Practices

1. Could you give me an estimate of the number of visits to your website?
2. Could you give me an estimate of the annual or monthly sales on your website? <i>Please note, this is so I can better understand the relative size of the sites whose owners I am interviewing.</i>
3. How do you decide which products to sell on your website?
4. In the past, how have you responded to changes in legislation affecting particular products? <i>E.g. a drug becoming illegal under the UK Misuse of Drugs Act</i>

5. Would there be circumstances where you would not sell or would withdraw particular products? What would these circumstances be- can you give an example?
6. Is there a relationship between different website owners? If so, can you describe this relationship? <ul style="list-style-type: none"> • What type of information is shared? • Is there a 'retail trade body'? Do you interact with this?
7. How do you respond to news stories or health alerts regarding fatal and non-fatal intoxications? Have you ever removed a product based on such information?
8. Do you have restricted substances which only certain people have access to?
9. How do you test the effects of new products? How does this inform decisions around deciding which products to make widely available?
10. Do you offer special deals on your website? <ul style="list-style-type: none"> • If so, do they have an effect on the sales of the NPS product? • How do you decide which products to sell as part of a special deal?
11. Which products are currently the most popular on your website? Why do you think that is?
12. How do you source your products?
13. Do you, as a retailer, exercise harm minimisation procedures through your website? If so, what are they?
14. What do you regard as responsible retailing? And what would be an example of irresponsible retailing?

NPS User Groups

(This PhD is based on the application of a theory to the diffusion of NPS and its suitability. Therefore it is necessary to briefly describe the theory. Everett Rogers' 1962 Diffusion of Innovations model

describes the process underlying the adoption of new innovations: an innovation can be defined as an idea, practice or object that is perceived as new by an individual or other unit of adoption. For my PhD, the innovation is an NPS product. Diffusion is the process through which an innovation (an NPS product) is communicated through certain channels (interpersonal networks or the media) over time among the members of a social system (a population).

The third element of the diffusion of innovations is time. Classifying members into adopter categories is based on the relative time of innovation adoption. Adopter categories are usually divided into five categories: *innovators*, *early adopters*, *early majority*, *late majority* and *laggards*.

Innovators actively seek out information about new ideas and innovations and can cope with higher levels of uncertainty surrounding innovations. Innovators are the first to adopt an innovation. They are more educated and from higher social status groups than other users and although they are seen as risk takers they adopt strategies to mitigate these risks. They have an ‘extensive knowledge’ about the drugs they take and they have regional and global contacts.

Early adopters are the second group who adopt an innovation and are seen as holding leadership roles. They are the group most commonly observed and they play an important role in increasing the confidence of potential users to adopt an innovation. If they adopt an innovation, it is more likely to spread through a population. They are well-connected to and integrated in their social networks.

The *early majority* have a good interaction with other members of the system but do not possess the same leadership roles as *early adopters*. The fourth category is the *late majority category*. This group waits until the majority of their peers have adopted the innovation before adopting and may do so as a result of mediators such as peer pressure. *Laggards* represent the fifth and final category. *Laggards* lack leadership roles and knowledge and awareness of innovations. They wait to see the success of the innovation amongst peers as they exist as a more traditional group).

1. Who do you think uses NPS products generally?
2. Who do you identify as NPS users purchasing from your website?
3. Do you believe that any of the categories (described above) fit your audience?
4. Do you think NPS users vary with the use of different NPS products? If so, can you give a couple of examples of different product use among different types of users?

The Media

Can you describe your thoughts on the relationship between the media and NPS products? <i>For example in terms of making products known and popular and the effect this has on legislation.</i>
1. How do you perceive the role of the media in the popularity of different NPS products? <i>For example through driving sales of products.</i>
2. Do you think the media reporting on deaths associated with use of particular products has an effect of popularity levels? If so, why? And if not, why not?

Current Policy Responses: The UK Psychoactive Substances Act

1. Can you tell me about your thoughts on the UK Psychoactive Substances Act, which will be introduced in April? <ul style="list-style-type: none">• <i>'Psychoactivity' is defined in the Psychoactive Substances Act as 'stimulating or depressing the person's central nervous system, it affects the person's mental functioning or emotional state; as measured by the production of a pharmacological response on the central nervous system or which produces a response in in vitro tests qualitatively identical to substances controlled under the Misuse of Drugs Act 1971'.</i>• What do you think about the definition of 'psychoactivity'?• And what do you think of possession not being an offence, but importation as being an offence, which may include buying from a website abroad?
2. How effective do you think the Act will be?
3. Do you think you have a role as a harm minimisation agent? <ul style="list-style-type: none">• How has the law restricted this?• What do you think the effects of this are?
4. How will the Act affect your retailing practice?
5. How will you adapt to the implementation of the Act? <ul style="list-style-type: none">• Will you chose to sell other products? <i>For example E-Cigarettes.</i>• Will you close down?• Or move abroad?

6. How do you think other NPS retailers will respond to the implementation of the Act?
7. Do you think that following the implementation of the Act that NPS users will continue to use NPS products or do you think they will use more traditional illegal drugs? And why?

Study Two Analysis Themes

<p><i>'Responsible' retailing and role of retailers as harm minimisation agents</i></p>	<p><i>'it's a case of selling the products that are less likely to cause problems' (R2)</i></p> <p><i>'Irresponsible retailing would include actively promoting the most addictive products on the market, 'upselling' more addictive products at the point of sale, aggressive offers that may lose you money initially with the hope of nurturing an addiction in a long term customer... irresponsible retailer doesn't care about the people on the other end of the transaction' (R1)</i></p> <p><i>'We've got to sell it on the fact that we think you're not going to take it. For legal reasons' (R3)</i></p>
<p>The PS Act</p>	
<p><i>Perceptions of the effectiveness of the Act</i></p>	<p><i>'a bad piece of legislation in general because it won't reduce harm' (R2)</i></p> <p><i>'bit of a knee-jerk reaction' (R3)</i></p> <p><i>a political 'emotional reaction' (R1) to say 'look what we're doing for the population' (R3)</i></p> <p><i>'This Act has never been about reducing harm' (R1)</i></p> <p><i>'it will go underground... it might actually cause more harm than good because then it's open to the sort of shadier characters and they're going to start mixing it with dodgy products... I mean at the moment all the powders, chemicals and the herbal incenses they have to be labelled exactly what's inside them. Cause it's underground, no one's going to really know. If they do get into</i></p>

	<p><i>trouble with taking some of the stuff and they get taken to hospital they won't know what chemicals they've actually taken... it's basically just giving a license now for the criminals to run the legal high bit or should I say now the illegal high business' (R3)</i></p> <p><i>'At the moment, all the powders, chemicals and the herbal incenses they have to be labelled exactly what's inside them. Cause it's underground, no one's going to really know. If they do get into trouble with taking some of the stuff and they get taken to hospital they won't know what chemicals they've actually taken... it's basically just giving a license now for the criminals to run the legal high bit or should I say now the illegal high business... and that's where it's going to end up going' (R3)</i></p> <p><i>'poor definition' (R1)</i></p> <p><i>a 'very, very vague definition' (R3)</i></p> <p><i>not a scientific or evidence-based definition' (R1)</i></p> <p><i>'seems like something they've [the government] just sort of concocted. They're not really sure what to call them or how to really legislate it. They've just put an umbrella description over it' (R3)</i></p> <p><i>'so hard to walk away from without being pushed' (R2)</i></p>
<p><i>Perceptions of the motivations behind the introduction of the Act</i></p>	<p><i>'there was no way they were ever going to keep up with the 'cat and mouse' game basically' (R2)</i></p>

<p><i>Possession offence aspect of the Act</i></p>	<p><i>'already admitting defeat in a way because they know they can't stop it... they're already criminalising a load of the population for illegal drugs. You know imagine how much the courts are going to be chockablock, if they actually said we're going to do you for possession as well. So yeah, that's probably more a financial decision, realising they can't actually really police this and enforce it at the end of the day'</i> (R3)</p>
<p><i>Perceptions of diffusion following the introduction of the Act</i></p>	<p><i>'risk importing from abroad or buying off street dealers'</i> (R2)</p> <p><i>'might just take what they can get rather than having that big choice'</i> (R2)</p>
<p>Innovation itself</p>	
<p>Compatibility</p>	<p><i>'years ago being sent a ziplock bag and cardboard label stapled on, with a smiley face and the product name "Pikey Dust". Let's just say that was an obvious "no", despite it being the exact same chemical that everyone else was pushing'</i> (R1)</p> <p><i>'sometimes the name itself will sell rather than actually what's inside'</i> (R3)</p> <p><i>'some people are also open to new experiences simply because they are new and exciting'</i> (R1)</p>
<p>Relative Advantage</p>	
<p>Accessibility</p>	<p><i>'fills people with a greater sense of confidence in the product than buying a gram (so, realistically, 0.6-0.8g) of mysterious white powder off of a guy in the corner of a nightclub who reckons it's probably cocaine'</i> (R1)</p> <p><i>'like to have guaranteed quality'</i> (R2)</p>

	products would <i>'always be available'</i> (R3)
<i>Purity</i>	<p><i>'so if they say it contains X percent of this, then it will contain that'</i> (R3)</p> <p><i>'expectation of certain levels of purity and consistency... Whether or not there's any truth to that is hard to ascertain'</i> (R1)</p> <p><i>'perfectly legal replacements with guaranteed purity if you're buying from the right place'</i> (R2)</p>
<i>Psychopharmacological effects</i>	<p><i>'the main reason why they buy it [an NPS product] is for the effects'</i> (R3)</p> <p><i>'If everything were still available to buy legally in pure form, mephedrone would top the stimulants category by a mile, even over cocaine. But, now mephedrone isn't available through the same channels as other NPS, people have moved on'</i> (R1)</p> <p><i>'ridiculously addictive and pharmacologically more potent than anything else people were 'used to'</i> (R1)</p>
<i>Perceptions of NPS in comparison to traditional illegal drugs</i>	<i>'stronger than cannabis' or 'less confusion/euphoria than crack/amphetamines'</i> (R1)
<i>Legality</i>	<p><i>'the legality appeals to idiots [who think that they would not face consequences for] being intoxicated in the wrong environment'</i> (R1)</p> <p><i>'absolutely was important to a good section of the market'</i> (R2)</p> <p><i>'A big role... It's a big plus isn't it really? I'm sure it annoys the police when they pull someone over and he's got this herbal high in his pocket,</i></p>

	<i>they can't nick him for it. Even though it's probably having the same effect as the illegal high... it's a big point' (R3)</i>
Communication Channels	
<i>Mass media</i>	<p><i>'someone hears about them for the first time and decides to find out more' (R1)</i></p> <p><i>'they called ethylphenedrate 'legal crack' and it's nothing like that in the slightest. But obviously that will no doubt have gone down well with certain people [laughing] with certain users who would have thought that that was a good recommendation' (R2)</i></p> <p><i>'no one else cared if we considered ourselves to be responsible' (R1)</i></p> <p><i>'if a symmetry exists between all similar products initially – for example, Black Mamba vs Blue Cheese vs Armageddon vs Pandora's Box... then the media has a huge role in breaking that symmetry and pushing forward an arbitrary winner. If a product is mentioned by name, people will search for that product by name' (R1)</i></p> <p><i>'I know my limits, this person obviously didn't' (R3)</i></p> <p><i>'I don't recall ever hearing any media reports on how they're sort of beneficial to society or anything positive about them' (R3)</i></p>
<i>Interpersonal channels</i>	
<i>Offline friendship networks</i>	<i>'word of mouth in social groups has contributed to the increase in use' (R2)</i>
<i>Online forums</i>	<i>'pretty much the primary source of info on new products' (R1)</i>

	<i>'even if 99 out of a 100 people really enjoy a new substance, if that one person with a negative experience replies first to a thread about a new substance, that will have a knock-on effect on popularity and uptake' (R1)</i>
Adopter Categories	
<i>Early majority, late majority and laggards</i>	[customers were] <i>'somewhere between an early adopter and the early majority' (R1)</i>
Social System	
<i>Opinion leaders and change agents</i>	<i>'some sensible heads on there really to you know really you know put a brake on some of the more rash people' (R2)</i>

Appendix 3: Study Three

Study Three Table of Interviewees

Profession	Gender	Country	Date	Method
Toxicologist	Male	United Kingdom	19/04/16	Telephone Interview
Advisory Council on the Misuse of Drugs (ACMD)	Male	United Kingdom	20/04/16	Telephone Interview
Police Representative	Male	United Kingdom	11/05/16	Telephone Interview
Government Health Department Representative	Male	United Kingdom	12/05/16	Telephone Interview
Government Health Department Representative	Male	United Kingdom	22/04/16	Telephone Interview
The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)	Male	Portugal	5/05/16	Telephone Interview
Think tank representative	Male	United Kingdom	6/05/16	Telephone Interview
Drugs Charity Representative	Female	United Kingdom	5/05/16	Telephone Interview
Addictions Psychiatrist	Male	United Kingdom	21/04/16	Telephone Interview
UK Ministerial Representative	Male	United Kingdom	11/03/16	Telephone Interview

Public Health Impact Coordinator	Male	United Kingdom	23/06/16	In person Interview
Public Health Specialist	Female	United Kingdom	23/06/16	In person Interview
Young Peoples Substance Misuse Service Team Leader	Female	United Kingdom	23/06/16	In person Interview
Police Representative	Female	United Kingdom	23/06/16	In person Interview
International Academic	Female	Australia	16/06/16	Skype Interview
Drugs Charity Representative	Male	United Kingdom	14/07/16	Skype Interview
International Drugs Charity Representative	Male	New Zealand	14/06/16	Skype Interview
International Ministerial Representative	Male	Poland	20/06/16	Skype Interview
International Early Warning System	Female	USA	17/8/16	Video Conference Interview
Journalist	Male	United Kingdom	19/8/16	Questions Sent



LIVERPOOL JOHN MOORES UNIVERSITY

Diffusion of New Psychoactive Substances: understanding population motives, harms and intervention needs.

Lucy Wallis

Centre for Public Health

You are being invited to take part in a research study. Before you decide whether to take part, it is important that you understand why the research is being done and what it involves. Please take time to read the following information and please ask me if there is anything that is not clear or if you would like further information.

What is the purpose of the study?

You are being asked to take part in a research study that is exploring the diffusion of new psychoactive substances (NPS). This research will investigate why different NPS diffuse and others fail to do so, in order to identify appropriate public health interventions to reduce harm. The interview will form a part of a PhD study.

Do I have to take part?

It is your decision whether you take part or not. You are free to withdraw at any time during the interview and without providing a reason. If you are not comfortable answering a question then please tell me and I will move onto the next question.

What will happen to me if I take part?

If you decide to take part a suitable time for an interview will be arranged. The interview will be conducted either over the telephone, via Skype or in person, in a place which is convenient for you.

At the start of the interview, I will explain the study to you and if you agree to take part you will be asked to sign a consent form or provide your consent verbally in the case of a telephone or Skype interview. During the conversation I will ask about your perception of the reasons for the diffusion

of different NPS and why people are choosing to access the products. We will also discuss the media, online forums, friendship networks, drug policy and how changes in drug policy are assumed to affect the diffusion of different products and vice versa. The interview will last for approximately forty five minutes.

Are there any risks / benefits involved?

There are no direct risks for you being involved in the study. You will not be pressured to answer questions you do not wish to.

Will my taking part in the study be kept confidential?

All the information that you provide will remain confidential. With your permission, the interview will be recorded. The recording will not be shared with anyone else and a copy of it will be saved on a password protected computer. After the interview has been transcribed the original recording will be deleted (a copy of it will remain on the password protected computer until the study has finished). Quotations from the interview may be used in the write up of the research report, but they will be anonymised.

Contact Details

If you have any questions or would like to discuss the study, please contact any of the researchers using the information provided below:

Lucy Wallis – PhD Student

L.A.Wallis@2015.ljmu.ac.uk

Supervisors

Prof Harry Sumnall

H.Sumnall@ljmu.ac.uk

Amanda Atkinson

a.m.atkinson@ljmu.ac.uk

Ms Judith Aldridge

judith.aldridge@manchester.ac.uk

*Centre for Public Health
Liverpool John Moores University
Henry Cotton Campus
15-21 Webster Street
Liverpool
L3 2ET*

If you any concerns regarding your involvement in this research, please discuss these with the researcher in the first instance. If you wish to make a complaint, please contact researchethics@ljamu.ac.uk and your communication will be re-directed to an independent person as appropriate.

Study Three Interview Guide

Introductory Questions

1. Can you tell me a bit about your current job?
2. How would you describe your involvement in NPS?

General NPS Questions

1. <i>The World Drug Report states that 95 countries have reported NPS and the number of NPS products currently being monitored by the EMCDDA is more than 450. Do you think NPS products have become more popular in recent years in the UK? To what extent do you think the NPS market has grown?</i>
2. How important do you think the internet has been in the growth of the NPS market?
3. Which NPS products would you say are currently the most popular?
4. How would you compare the use of NPS to other more traditional illegal drugs? <i>In terms of use patterns, harms, user groups, prevalence.</i>
5. Why do you think mephedrone became so popular and do you think another NPS will ever emulate it?

Reasons for different NPS use in general

1. <i>Common reasons users give for their use of NPS relate to their legality, price, lack of detection in drug tests, and ease of access. Why do you think people choose to use NPS products? Does this differ for different individuals- can you give some examples?</i>
2. How do you think individuals select a particular NPS product, what characteristics do you think they are looking for?
3. What role do you think the following attributes play in choosing an NPS product:
a. Price

b. Legality
c. Purity
d. Psychopharmacological effects/ side effects
e. Lack of detection in drug tests
f. Accessibility
4. Is the similarity, in terms of psychopharmacological effects, between an NPS product and its assumed illegal substitute important?
5. Who do you think identify as users of NPS products generally?
6. Do you think NPS users vary with the use of different NPS products? If so, can you give a couple of examples of different product use among different types of users?

Online Drug Forums and Offline friendship networks

1. What can you tell me about online drug forums?
2. Please describe the role you think online drug forums have in affecting the spread and popularity of different NPS products.
3. Conversely, how important do you think offline friendship networks are in the spread of a particular NPS product?

The Media

3. Can you describe your thoughts on the relationship between the media and NPS products? <i>For example in terms of making products known and popular and the effect this has on legislation.</i>

4. How do you perceive the role of the media in the popularity of different NPS products? <i>For example through driving sales of products.</i>

Drug Policy Making in the UK

1. How would you describe the history of NPS drug policy in the UK?
2. How would you describe the policy-making process in the UK in relation to drugs, especially NPS?
3. In your opinion, what is the role of research and research evidence in drug policy-making in the UK?

Psychoactive Substances Act

1. What do you think the motivations were behind the Psychoactive Substances Act?
2. Can you tell me about your thoughts on the Act? <ul style="list-style-type: none"> a. <i>'Psychoactivity' is defined in the Psychoactive Substances Act as 'stimulating or depressing the person's central nervous system, it affects the person's mental functioning or emotional state; as measured by the production of a pharmacological response on the central nervous system or which produces a response in in vitro tests qualitatively identical to substances controlled under the Misuse of Drugs Act 1971'.</i> b. What do you think about the definition of 'psychoactivity'? c. And what do you think of possession not being an offence, but importation as being an offence, which may include buying from a website abroad?
3. How effective do you think the Psychoactive Substances Act will be?
4. Where do you think the challenges of the implementation of the Psychoactive Substances Act lie?
5. Why do you think implementation of the Act has been delayed?

6. Why do you think the Act has been criticised?
7. Which alternative approaches, instead of the Psychoactive Substances Act, do you think could have been implemented? Why do you think these were not implemented?
8. Do you think that following the implementation of the Act that NPS users will continue to use NPS products or do you think they will use more traditional illegal drugs? And why?
9. How do you think the implementation of the Act will affect which NPS products become popular?

Study Three Analysis Themes

<p><i>Perceptions of the prevalence of NPS use</i></p>	<p><i>'we're probably in danger of overestimating their [NPS] relevance and importance' (P8, toxicologist)</i></p>
<p><i>The definition of NPS</i></p>	<p>there is a <i>'difficulty of knowing what NPS actually are'</i> (P13, international academic)</p> <p><i>it's important to be clear about what it is that we're talking about with NPS because it's not a particularly well-defined term in my view'</i> (P20, think tank representative)</p> <p><i>'the legal high shops, [both online and offline] the headshops selling substances that aren't controlled' so can be 'legally purchase[d]'</i> (P14, drugs charity representative)</p>
<p>Diffusion</p>	<p><i>'they arrive, they don't do an awful lot and then they sort of disappear'</i> (P19, police representative)</p>
<p><i>Mephedrone as a drug successfully diffusing in the UK</i></p>	<p><i>'a rapidly growing NPS', 'taking the country by siege', 'an extraordinary rise in the number of users' and taking a 'strong hold' in the user community (P9, ACMD representative)</i></p> <p><i>'if you wanted to develop the drug of misuse then if the pharmaceutical industry had developed mephedrone they'd be absolutely delighted... it ticks all the boxes'</i> (P8, toxicologist)</p>
<p>The PS Act</p>	
<p><i>Perceptions of the motivations for the introduction of the Act</i></p>	<p>the Act would banish <i>'embarrassing stories about kids buying potent highs in high street shops'</i> (P4, drugs charity representative)</p>

	<p><i>'so desperate to be seen to be doing something about legal highs because of the media reporting around things like 'legal highs' death' when legal highs weren't even involved'</i> (P14, drugs charity representative)</p> <p><i>'no tools' to do so but 'it was causing us as much disruption as your heroin, your cocaine, the rest of it'</i> (P10, police representative)</p>
<p><i>Perceptions of the Act</i></p>	<p><i>'poorly conceived, poorly executed', 'just so crass and so poorly thought out'</i> (P1, addictions psychiatrist)</p> <p><i>'rubbish. I don't like it. I understand the need to respond, I think it's the wrong response'</i> (P4, drugs charity representative)</p> <p><i>'the very weak legislation, the very badly drafted legislation'</i> (P14, drugs charity representative)</p> <p><i>'so vague... non-descript... probably really difficult to implement or make any real change'</i> (P18, young people's substance misuse service representative)</p> <p><i>'initial hit on headshops, suppliers and internet' it will be used to deal with 'particular problems'</i> (P19, police representative)</p> <p><i>'opportunity to have quite a large scale impact'</i> (P19, police representative)</p>
<p><i>Perceptions of the criminalisation aspect of the Act</i></p>	<p><i>'almost like incentivizing, you're not going to get into bother for having it as long as you</i></p>

	<p><i>don't sell it to anyone else, just use it yourself'</i> (P9, police representative)</p>
<p><i>Tension with Misuse of Drugs Act</i></p>	<p><i>'better to have NPS in your pocket than heroin, amphetamine or cannabis'</i> (P3, international ministerial representative)</p> <p><i>'if you've got some ecstasy powder or ecstasy pills on you, you can get seven years in prison. But if you've got another pill that's effectively going to have the same effects as ecstasy and has a similar or equal risk profile but is covered by the NPS Act you won't be subject to any sanction at all'</i> (P20, think tank representative)</p> <p><i>'one [the MDA] is based on harm, the other one [the PS Act] is based on just identifying psychoactive substances'</i> (P9, ACMD representative)</p>
<p><i>The definition of psychoactivity</i></p>	<p><i>'unenforceable' and 'fraught with problems'</i> (P8, toxicologist)</p> <p><i>'were told that the Home Office lawyers couldn't use the word 'novel' because it's not legally definable and therefore they just use 'psychoactive''</i> (P9, ACMD representative)</p> <p><i>'If we go back to some of the concerns that people have, actually they're misplaced because in order for it to be a psychoactive substance under the Act you've got to have the intent anyway. If there's no intent, it doesn't count'</i> (P19, police representative)</p>

	<p><i>'really frustrating if we get the warrant, get the drugs back and the Crown Prosecution Service say 'ok you've proved it's NPS, but you've not proved the [psychoactive] effect'. And it doesn't take many of those kind of prosecutions failing for people to think 'well, why are we busting a gut? Let's go back and deal with cocaine and heroin which are just straight up' (P10, police representative)</i></p> <p><i>'two, three or even four different bits of legislation' and this made it 'confusing for users, it's confusing for emergency services, it's confusing for the police' (P20, think tank representative)</i></p>
<p><i>Perceptions of NPS being treated as a separate issue to traditional illegal drugs</i></p>	<p><i>'... the strange thing is that the [UK] PS [Act] is said to be modelled very closely on the Irish example and yet they have yet to hear from the Irish government any feedback... on whether or not their PS Bill has been successful or not. Five or six years later, because it was introduced five or six years ago, and there's been no special report whatsoever. We have rumours that the, the Act has hit problems in terms of defining whether a compound is or is not psychoactive and I suspect that's still a weakness of the [UK] PS [Act]' (P9, ACMD representative)</i></p> <p><i>'these are wicked and complex problems.. the notion that there's going to be, a simple, one single fix is a fallacy' (P16, governmental health department representative)</i></p>

Innovation Itself	
Compatibility	<i>'apply the same principles for use as they do with the drug they're most familiar with'</i> (P1, addictions psychiatrist)
Relative advantage	
Legality	<p><i>'you can avoid trouble with the police. I think it's valuable'</i> (P3, Polish representative)</p> <p><i>'it appeared important'</i> (P12, EMCDDA representative)</p> <p><i>'I think legality does, it does have a bearing'</i> (P16, government health department representative)</p> <p><i>'I don't think it [legality] matters'</i> (P2, public health impact coordinator)</p> <p><i>'if people don't like the drug, they don't buy it again. Regardless of whether it's legal or became illegal'</i> (P8, toxicologist)</p> <p><i>'even if it's illegal it [NPS] will remain popular'</i> (P9, ACMD representative)</p> <p><i>'I don't think it [legal status] matters a damn... these drugs aren't used just because they're legal, you know that's one of the least important factors for people using substances'</i> (P14, drugs charity representative)</p> <p>the legal status makes <i>'no difference whatsoever... certainly for young people'</i> (P18, young people's substance misuse)</p>

	service representative)
<i>Legality as a secondary relative advantage</i>	<p><i>'if you've got an option of two, just hypothetically two equivalent substances that were going to have very similar effects and one of them is legal and one of them is not. And one of them you can buy on the high street and one of them you have to buy off a dodgy dealer. Then the legal one obviously has, in relative terms at least, an appeal'</i> (P20, think tank representative)</p> <p><i>'is it any surprise to us that you know some of the largest outbreaks related to synthetic cannabinoids have been in the states where they have some of the most prohibitionist policies towards cannabis in terms of the user level?'</i> (P12, EMCDA representative)</p>
Availability	<i>'whatever the hell they can get their hands on. And so they will take whatever's available'</i> (P17, New Zealand representative)
Accessibility	
<i>Perceptions of accessibility importance for different populations</i>	<i>'as soon as we closed this one outlet down, which was the only outlet we had, it [use] drastically reduced'</i> (P10, police representative)
Lack of detection	<i>'that [SCRA prevalence in prisons] is a nightmare entirely of our own making. That those products would never have existed if cannabis had been legalised you know a generation ago and properly regulated'</i> (P20, think tank representative)
Price	<i>'price is king' and 'absolutely vital around people's decisions'</i> (P17, New Zealand representative)

<i>Effects</i>	<i>'less impressive versions of their various counterparts' (P1, addictions psychiatrist)</i>
Communication Channels	
Mass media	
<i>Perceptions of the media as a communication channel in affecting the diffusion of NPS</i>	<p><i>'there's no such thing as bad publicity' (P8, toxicologist)</i></p> <p><i>'kept constantly on the attention of young people... it certainly does nothing to diminish the use' (P8, toxicologist)</i></p> <p><i>'not only were they [the media] promoting it [mephedrone] through their reportage but also because of the nature of the internet they were actually providing direct links to suppliers of it' (P14, drugs charity representative)</i></p> <p><i>'a red rag to a bull, they're going to go out and buy that substance' (P13, international academic)</i></p> <p><i>'drove people into the stores to stockpile all these things and shops were having firesales' (P17, international drugs charity representative)</i></p>
Interpersonal channels	
<i>Friendship networks</i>	<p><i>'young people definitely listen to their friends when they're making decisions to use drugs' (P4, drugs charity representative)</i></p> <p><i>'if their mate tells them it's safe they might still take it' (P10, police representative)</i></p> <p><i>'if the social norm of the group or groups you belong to is to use substances then the</i></p>

	<p><i>likelihood of you to use them is more'</i> (P7, UK government health department representative)</p> <p><i>'for some people they [offline friendship networks] will be, for some people they won't be. I think you know the influence and advice of someone that you know and trust is still powerful, but obviously there's just loads of stuff out there on the internet isn't there?'</i> (P16, UK government health department representative)</p>
Online Forums	<i>'the information gap is greater... if you want to know about them, the only source of information are the user forums'</i> (P8, toxicologist)
<i>Online forums as a harm reduction resource</i>	<p><i>'they're often the best, often the best place to understand the potential harms of these products'</i> (P17, international drugs charity representative)</p> <p><i>'how reliable the data is, is a different matter, but that's all there is'</i> (P8, toxicologist)</p> <p><i>'seems to be absolutely split down the middle, half of them love it and the other half hate it'</i> (P8, toxicologist)</p>
<i>Perceptions of online forums as a communication channel in affecting the diffusion of NPS</i>	<p><i>'if somebody puts that it's good stuff... it's like the trend setter'</i> (P3, Polish representative)</p> <p><i>'I think the internet's been... how popularity grows for one or the other. Absolutely important'</i> (P9, ACMD representative)</p>

	<p><i>'I think also it gives a pretty good indication of whether the drug will disappear or not'</i> (P8, toxicologist)</p> <p><i>'they identify new substances as they come up and they're one of the reasons why you know products may pick up in popularity or otherwise'</i> (P14, drugs charity representative)</p> <p><i>'leading edge indicators of drugs trends... you might find the first mentions of some of these drugs happening on the online forums... in that sense they can be one of the first to peak people's interest or to host a sort of an initial thread, and initial experiences'</i> (P13, international academic)</p> <p><i>'with [National NPS Early Warning System] we do, we are working with a colleague... at the Medical Examiners office and he does regular internet scans for us to look for information to alert us to what's showing up on the forums'</i> (P5, international EWS representative)</p> <p><i>'a great place to launch products and generate a buzz'</i> but moderators had now become <i>'wise to it'</i> and this was happening less (P11, journalist)</p>
<p><i>Perceptions of the importance of online forums for different populations</i></p>	<p><i>'know more about the drugs than we [the forensic service] do'</i> (P8, toxicologist)</p> <p><i>'there's 1% of an online community they're the super users. They're the ones doing... the bulk of the postings... they're the super</i></p>

	<p><i>users also they'll have most of the control, moderators, administrators. And 9% who are doing the regular, run-of-the-mill sort of stuff. And 90% are lurking and not saying anything at all' (P13, international academic)</i></p>
Adopter Categories	
Innovators	<p><i>'new drug frontier, pioneer type people' (P6, public health specialist)</i></p> <p><i>'who will try anything new, just for the sake of registering what sort of experience they get' (P9, ACMD representative)</i></p> <p><i>'someone who is... exploring the use of psychoactive substances' (P12, EMCDDA representative)</i></p> <p><i>'there's a crew of people that are just really curious about different compounds... for those people they're going to seek out the new research chemical more' (P13, international academic)</i></p> <p><i>'that contingent that will try something new for the sake of it because it's different and new' (P13, international academic)</i></p> <p><i>'there are your psychonauts who are just experimenting so that's fine' (P1, addictions psychiatrist)</i></p> <p><i>'I'm less concerned about the safety of that group' (P13, international academic)</i></p>

<p>Early majority</p>	<p><i>'when you read on the forums, it is really intellectualized... a substance is being picked for a particular effect, or a reaction at a particular dosage... It is very different to what we see for our young people walking through the door'</i> (P18, young people's substance misuse service representative)</p> <p><i>'walk into a shop and get their milk and NPSs at the same time'</i> (P17, international drugs charity representative)</p>
<p>Late majority and laggards</p>	<p><i>'just use what's there at the time and what's cheap... that may just be that that's NPS'</i> (P19, police representative)</p>
<p>Social System</p>	
<p>Change agents</p>	<p><i>'where there is profit to be made and good wills and good intentions can be side-tracked'</i> (P1, addictions psychiatrist)</p>
<p>Opinion leaders</p>	<p><i>'if it's [a post] really long, if it's quirky and it's funny, I think people are more likely to respect that opinion'</i> (P4, drugs charity representative)</p>

Appendix 4: Study Four

Study Four Participant Information Sheet



Understanding the importance of different factors associated with drug use decision-making

Lucy Wallis, PhD Student

Public Health Institute

Liverpool John Moores University

You are being invited to take part in a research study. Before you decide whether to take part, it is important that you understand why the research is being done and what it involves. Please take time to read the following information and please contact me if there is anything that is not clear or if you would like further information.

What is the purpose of the study?

The purpose of the study is to explore the relative importance of different attributes relating to drug preference.

Do I have to take part?

It is your decision whether you take part or not. You are free to withdraw at any time during the study and without providing a reason. If you are not comfortable answering a question then you can move onto the next question or stop completely.

What will happen to me if I take part?

This research involves completing an online questionnaire that includes demographic questions and questions relating to which features of drugs influence decisions to use. Additionally, the study will ask you to rank hypothetical products in order to establish the relative importance of drug attributes.

The questionnaire will take approximately fifteen minutes to complete and will form a part of a PhD study.

Are there any risks / benefits involved?

There are no direct risks for you being involved in the study. If you would like more information about drugs or drug use then please visit one of the links below.

Will my taking part in the study be kept confidential?

All the information that you provide will remain confidential and we do not ask you for your name or address. Your data will be submitted to a secure server and only the researcher will have access to the data. All downloaded data will be password protected on a standalone computer.

Contact Details

If you have any questions or would like to discuss the study, please contact any of the researchers using the information provided below:

Lucy Wallis – PhD Student

L.A.Wallis@2015.ljmu.ac.uk

Supervisors:

Prof Harry Sumnall

H.Sumnall@ljmu.ac.uk

Amanda Atkinson

a.m.atkinson@ljmu.ac.uk

Prof Judith Aldridge

judith.aldridge@manchester.ac.uk

Public Health Institute

Liverpool John Moores University

Henry Cotton Campus

15-21 Webster Street

Liverpool

L3 2ET

If you any concerns regarding your involvement in this research, please discuss these with the researcher in the first instance. If you wish to make a complaint, please contact researchethics@ljmu.ac.uk and your communication will be re-directed to an independent person as appropriate.

If you would like information on where to get support for drug use then please visit sites such as:

<http://www.addaction.org.uk>

<http://www.erowid.org>

<http://www.talktofrank.com/>

Study Four Questionnaire and CBC

**Understanding the importance of
different factors associated with drug
use decision-making questionnaire**



I have read the information sheet provided and I am happy to participate. I understand that by completing and returning this questionnaire I am consenting to be part of the research study and for my data to be used as described. I also confirm that I am living in the UK.

I agree

The survey will start with some questions about who you are. Remember that this survey is **confidential and anonymous**.

How old are you?

What is your gender?

What is your ethnic group?

- White
- Mixed/Multiple ethnic groups
- Asian/Asian British
- Black / African / Caribbean / Black British
- Other ethnic group
- Prefer not to say

What is your current main employment status?

- Full-time employment
- Part-time employment
- Student
- Not in employment or education
- Other
- Prefer not to say

The survey will now ask some questions about your drug use history and drug purchasing locations. Remember that this survey is **confidential** and **anonymous**.

Which of the following drugs have you used at least once in the past (only tick one option for each drug)?

	Use in lifetime only	Use in last year only (not last month)	Use in last month	Never
Alcohol	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Amphetamines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cannabis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cocaine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ecstasy/MDMA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GHB/GBL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ketamine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LSD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Magic mushrooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mephedrone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nitrous oxide	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Revelin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Synthetic cannabinoids (Spice)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Synthetic cathinones (eg alpha-PVP)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tobacco	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other NPS (new psychoactive substances)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you have used NPS (new psychoactive substances, for example Spice) what form did they take (tick all that apply)?

- A herbal smoking mixture
- A powder, crystal or tablet
- A liquid
- Another form
- Not applicable

Where do you currently most often purchase your drugs from (choose one)?

- Dark net websites (cryptomarkets eg Dream Market)
- Clear net websites (eg www.chem.eu)
- Friends/ Acquaintances
- A known dealer
- A dealer not known personally
- Other

How easy would it be for you to access a drug such as cannabis?

- Very easy
 - Moderately easy
 - Neither easy nor difficult
 - Moderately difficult
 - Very difficult
 - Do not know



The survey will now ask some questions about your harm reduction practices and your information seeking behaviour. Remember that this survey is **confidential** and **anonymous**.

How likely are you to seek out information about the harms and effects of drugs?

Very likely
Likely
Neither likely nor unlikely
Unlikely
Very unlikely



Do you discuss drug use on online drug discussion forums (eg Bluelight)?

Yes
No
Do not want to say



If so, how much influence do they have in your decision to use a particular product?

Not applicable
Very strong influence
Strong influence
Mild influence
No influence
Do not know



What aspects of the online drug discussion forums do you pay most attention to (tick all that apply)?

- Not applicable
- Information about the effects of a product
- Information about the harmful side effects of a product
- The price of a product
- The availability of a product
- Other

If there was **positive** discussion around a particular drug on an online drug discussion forum, what is the likelihood of you trying the drug?

Not applicable
Very likely
Moderately likely
Neither likely nor unlikely
Moderately unlikely
Very unlikely
Do not know



If there was **negative** discussion around a particular drug on an online drug discussion forum, what is the likelihood of you trying the drug?

- Not applicable
- Very likely
- Moderately likely
- Neither likely nor unlikely
- Moderately unlikely
- Very unlikely
- Do not know



Are there other features of online drug discussion forums which are important to you? If so what are they?

What drug harm reduction practices do you currently engage in (tick all that apply)?

- Only purchase drugs from a trusted source
- Use drugs only with friends
- Avoid frequent and heavy use of drugs
- Get in a positive mood prior to use of drugs
- Use of a test kit to test for the purity of the drug
- Other
- None of the above

Where do you currently seek out information from about the harms and effects of drugs (tick all that apply)?

- Dark net retailers (retailer descriptions and customer reviews)
- Clear net retailers (retailer descriptions and customer reviews)
- Medical experts
- Friends/Acquaintances
- Online forums (eg Bluelight)
- Other online resources
- Police
- Independent drug information websites (eg Erowid)
- Government led drug information websites (eg Talk to Frank)
- Other
- None of the above

If a product was mentioned in the media in relation to **harmful outcomes** how likely would this make you try it?

- Very likely
- Moderately likely
- Neither likely nor unlikely
- Moderately unlikely
- Very unlikely
- Do not know



If a product was mentioned in the media in relation to a **general discussion about the product** how likely would this make you to try it?

- Very likely
- Moderately likely
- Neither likely nor unlikely
- Moderately unlikely
- Very unlikely
- Do not know



This part of the survey asks you to imagine three brand new drugs that have either i) ecstasy-like effects; ii) hallucinogen-like effects; or iii) cannabis-like effects. Read all the different attributes associated with these drugs and then select one of the choices. The attributes will change each time, so think carefully about how important things like accessibility, price, drug category, desired effects and side effects are to you. Remember that this survey is **confidential** and **anonymous**.

Please rate the following attributes in terms of how desirable they are.

	Undesirable	Somewhat Desirable	Very Desirable	No Opinion
Ecstasy-like drug	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hallucinogen-like drug	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cannabis-like drug	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If these were your **only options**, which would you choose?

1 / 13

Drug category	Hallucinogen-like drug	Cannabis-like drug	Ecstasy-like drug	Hallucinogen-like drug
Accessibility	Difficult to obtain	Moderately easy to obtain	Moderately difficult to obtain	Easy to obtain
Price (of drug experience for one episode)	£1-10 per dose	£31-40 per dose	£21-30 per dose	£1-10 per dose
Desired effects	High chance of desired effects	Very low chance of desired effects	High chance of desired effects	Moderate chance of desired effects
Side effects	Very low chance of unwanted side effects	Moderate chance of unwanted side effects	Very low chance of unwanted side effects	Very low chance of unwanted side effects
	Select	Select	Select	Select

Study Four Questionnaire Findings

Question 1: How old are you?

Age	Percentage
18	5.8%
19	5.3%
20	10.5%
21	12.1%
22	8.4%
23	3.2%
24	4.7%
25	7.4%
26	6.8%
27	3.2%
28	2.1%
29	3.2%
30	6.3%
31	4.2%
32	3.2%
33	2.6%
34	4.7%
35	6.3%

Mean: 25.28

Median: 24.50

Mode: 21

Standard Deviation: 5.260

Question 2: What is your gender?

Gender	Percentage
Female	35.8%
Male	63.7%
Transfemale	0.5%

Question 3: What is your ethnic group?

Ethnicity	Percentage
White	88.9%
Mixed/Multiple ethnic groups	4.7%
Asian/Asian British	2.6%

Other ethnic group	2.1%
Prefer not to say	1.6%

Question 4: What is your current main employment status?

Employment	Percentage
Full-time employment	27.4%
Part-time employment	8.9%
Student	48.4%
Not in employment or education	5.8%
Other	6.3%
Prefer not to say	3.2%

Question 5: Which of the following drugs have you used at least once in the past?

	Use in lifetime	Use in last year	Use in last month	Never	Total Use
Alcohol	7.9%	6.8%	84.2%	1.1%	98.9%
Amphetamines	20.5%	11.6%	12.1%	55.8%	44.2%
Cannabis	19.5%	27.9%	48.4%	4.2%	95.8%
Cocaine	17.9%	20.0%	23.2%	38.9%	61.1%
Ecstasy/MDMA	25.3%	25.8%	17.4%	31.6%	68.4%
GHB/GBL	7.9%	0.5%	2.1%	89.5%	10.5%
Ketamine	22.6%	11.1%	10.0%	56.3%	43.7%
LSD	20.5%	16.3%	5.3%	57.9%	42.1%
Magic Mushrooms	24.7%	19.5%	12.6%	43.2%	56.8%
Mephedrone	12.6%	1.1%	1.6%	84.7%	15.3%
Nitrous Oxide	24.2%	10.5%	10.5%	54.7%	45.3%
Revelin	1.1%	0%	0%	98.9%	1.1%
SCRA	15.3%	3.7%	1.6%	79.5%	20.5%
Synthetic cathinones	5.3%	1.6%	1.1%	92.1%	7.9%
Tobacco	26.3%	14.2%	49.5%	10.0%	90.0%
Other NPS	9.5%	7.4%	5.8%	77.4%	22.6%
Other	20.0%	6.3%	12.1%	61.6%	38.4%

Question 6: If you have used NPS, what form did they take? (Tick all that apply)

Form	Percentage
Herbal smoking mixture	16.3%
Powder/crystal/tablet	18.9%
Liquid	4.2%
Other form	3.7%
N/A	68.9%

Question 7: Where do you currently most often purchase your drugs from?

Purchase location	Percentage
Darknet websites	5.8%
Cleartnet websites	5.3%
Friends/Acquaintances	34.7%
A friend dealer	28.9%
A dealer not known personally	13.7%
Other	11.6%

Question 8: How easy would it be for you to access a drug such as cannabis?

Ease	Percentage
Very easy	69.5%
Moderately easy	20.5%
Neither easy nor difficult	6.3%
Moderately difficult	1.1%
Very difficult	1.1%
Do not know	1.6%

Question 9: How likely are you to seek out information about the harms and effects of drugs?

Likelihood of seeking information	Percentage
Very likely	53.7%
Moderately likely	22.6%
Neither likely nor unlikely	10.0%
Moderately unlikely	10.0%
Very unlikely	3.7%

Question 10: Do you discuss drug use on online drug discussion forums?

Do you discuss?	Percentage
Yes	42.1%
No	57.4%
Do not want to say	0.5%

Question 11: If so, how much influence do they have in your decision to use a particular product?

Level of influence	Percentage
N/A	44.7%
Very strong influence	5.8%
Strong influence	16.8%
Mild influence	18.9%
No influence	9.5%
Do not know	4.2%

Question 12: What aspects of the online drug discussion forums do you pay most attention to? (Tick all that apply)

Reason for use	Percentage
N/A	38.9%
Effects	53.7%
Side effects	53.2%
Price	7.9%
Availability	10.0%
Other	3.3%

Question 13: If there was positive discussion around a particular drug on an online drug discussion forum, what is the likelihood of you trying the drug?

Likelihood	Percentage
N/A	15.8%
Very likely	6.3%
Moderately likely	30.0%
Neither likely nor unlikely	31.1%
Moderately unlikely	5.8%
Very unlikely	6.8%
Do not know	4.2%

Question 14: If there was negative discussion around a particular drug on an online drug discussion forum, what is the likelihood of you trying the drug?

Likelihood	Percentage
N/A	15.8%
Very likely	1.6%
Moderately likely	5.3%
Neither likely nor unlikely	14.2%
Moderately unlikely	23.7%
Very unlikely	35.8%
Do not know	3.7%

Question 15: Are there other features of online drug discussion forums which are important to you?

Free text

Question 16: If there was positive discussion around a particular drug among your friendship network, what is the likelihood of you trying the drug?

Likelihood	Percentage
Very likely	18.4%
Moderately likely	46.3%
Neither likely nor unlikely	19.5%
Moderately unlikely	7.4%
Very unlikely	6.8%
Do not know	1.6%

Question 17: If there was negative discussion around a particular drug among your friendship network, what is the likelihood of you trying the drug?

Likelihood	Percentage
Very likely	2.1%
Moderately likely	2.1%
Neither likely nor unlikely	15.8%
Moderately unlikely	26.3%
Very unlikely	52.1%
Do not know	1.6%

Question 18: What drug harm reduction practices do you currently engage in? (Tick all that apply)

What harm reduction practice	Percentage
Purchase from trusted source	67.4%
Use drugs with friends	57.9%
Avoid frequent/heavy use of drugs	71.6%
Get in positive mood before drug use	51.6%
Use test kit for purity	13.2%
Other	18.4%
None of the above	5.3%

Question 19: Where do you currently seek out information from about the harms and effects of drugs? (Tick all that apply)

Where to seek information	Percentage
Darknet retailers	6.8%
Cleartnet retailers	10.0%
Medical experts	31.6%
Friends/Acquaintances	59.5%
Online forums	52.1%
Other online resources	48.4%
Police	4.2%
Independent drug info websites	56.3%
Government led drug info websites	20.0%
Other	6.3%
None of above	7.4%

Question 20: If a product was mentioned in the media in relation to harmful outcomes how likely would this make you try it?

Likelihood	Percentage
Very likely	1.6%
Moderately likely	2.6%
Neither likely nor unlikely	45.8%
Moderately unlikely	13.2%
Very unlikely	32.6%
Do not know	4.2%

Question 21: If a product was mentioned in the media in relation to a general discussion about the product how likely would this make you to try it?

Likelihood	Percentage
Very likely	1.1%
Moderately likely	8.4%
Neither likely nor unlikely	69.5%
Moderately unlikely	5.8%
Very unlikely	12.6%
Do not know	2.6%