From Measurement to Intervention: Key Factors Contributing to Risky Sexual Behaviour in Adults

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Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Doctor of Philosophy is entirely my own work, and that I have exercised reasonable care to ensure that the work is original and have conformed to the regulations on the use and declaration of Generative AI, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save

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Tools: Clearly indicate the tool name and model (or version) you used and the date(s) of use. If you used a tool multiple times, provide the range of dates over which the tool was used and the model/versions used.	***Example:*** ***Google Gemini, 2.0 Flash, used between 08/01/2025 and 25/03/2025***	ChatGPT, used between 01/01/2024 and 01/07/2025 Google Gemini, used 01/01/2025 to 01/09/2025
Outputs: Specify what tool outputs were generated and used by you and for what purpose.	***Example:*** ***I used (tool name) to create summaries of articles in order to ascertain their relevance for further inclusion in my reading list and literature review.***	I used ChatGPT to standardise measures I was developing as part of a study. I used it to develop distractor measures that I used as part of an experiment. I used it to check R code for data analysis. I used Gemini to double check running and reporting of statistical analysis on SPSS.
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		across the scenarios. Can you also identify any problems with any of the scenarios from an experimental perspective - Which scenarios contain coercion, manipulation or pressure - Could you give me 5 quiz questions about recycling in Ireland - Could you give me 5 quiz questions about sun safety - imagine you are a researcher, measuring sexual discounting in 60 participants. You are trying to calculate the area under the curve value for each participant using the Myerson et al (2001) formula. Participants completed a sexual discounting task, where they indicated on. ascale of 0-100 if they would have unprotected sex with a hypothetical partner. How would you calculate y1 and y2, for each participant from the data that you have, so that you can input it into Myerson and colleagues' formula - - You said: - I want to do data analysis using R script. I have data from a sexual discounting task. As part of this task, participants had to indicate the likelihood of using a condom after a specified delay with a hypothetical partner. There were 8 delays and 4 hypothetical partners, so there 32 questions, or trials. The delays were as follows: no delay, 1 hour, 3 hours, 6 hours, 1 day, 1 week, 1 month, 3 months. The four types of hypothetical partners were as follows: most want to have sex with, least want to have sex with, most likely to have an STI, least likely to have an STI. I

		asked participants to do the full task three times, so I have 96 trials for each participant. I have 69 participants. Participants completed the task after viewing a prime. The first prime was regarding sexual health, the second prime was regarding sun safety, and the third prime was related to recycling - - The first thing I want to do in R is remove non-systematic responses. Any trial response that is greater than 0.2 than the response given in the previous trial is considered non-systematic. This value must be replaced with the average score of the previous and subsequent trial. If the new value is still 0.2 greater than the previous trial response, responses of that participant for that partner condition should be excluded from further analysis. The procedure for replacing a non-systematic response for the final trial in a partner condition, i.e. for the 3 month delay, is different. If there's a non-systematic value in this trial, it should be replaced with the value from the previous trial, i.e. the response from the 1 month delay trial. Participants that have provided more than one non-systematic response per participant condition should also be excluded from further analysis. - - I want the code to be able to do this first step, but also the code to access the data file and install the correct packages into R.
Iterations: Provide some commentary on the number and type of iterations. This can be linked to your report on prompts and outputs above.	If I was asking a statistical question, I may have requested between 2-5 iterations in order to clarify the response. When asking for help standardising measures, I may have followed 2 or 3 times in order to provide more clarity as to what I wanted	

Critical Reflection: If Gen AI tools have been used minimally, a very brief critical reflection on its role in the research submitted for examination can be included here. Otherwise, specify the parts of the thesis where critical reflection on the use and role of Gen AI tools is included.	The extent of AI use in this thesis was to help develop materials, and to clarify statistical procedures. Changes made to materials based on feedback from AI was ran past the supervisory team on this PhD. Furthermore, I conducted a pre-experiment to ensure that the changes I made to measures were effective and resonant with participants. The help with statistical procedures was primarily for the purpose of double checking my own knowledge. All of my procedures I clarified again with my supervisory team and with any relevant literature. The use of AI in this PhD was minimal, and no recommendation from AI was taken in isolation.

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List of Abbreviations

Abbreviation	Explanation
AUC	Area under the curve
CDC	Centers for Disease Control and Prevention
DoE	Department of Education
DoH	Department of Health
DoxyPEP	Doxycycline post-exposure prophylaxis
gbMSM	Gay and bisexual men who have sex with men
gbWSW	Gay and bisexual women who have sex with women
HIV	Human immunodeficiency virus
HPSC	Health Protection Surveillance Centre
HPV	Human papillomavirus
HSE	Health Service Executive
IGT	Iowa Gambling Task (Bechara et al., 1995)
MCQ	Multiple choice questionnaire
MDD	Monetary delay discounting
MSM	Men who have sex with men
NCCA	National Council for Curriculum Assessment
NSHS	National Sexual Health Strategy
PEP	Post-exposure prophylaxis
PrEP	Pre-exposure prophylaxis
RSE	Relationships and Sexuality Education
SCSE	Sexual Communication Self-Efficacy
SDDT	Sexual delay discounting task
SHCPP	Sexual Health and Crisis Pregnancy Programme
SPDT	Sexual probability discounting task
SRS	Sexual Risk Survey (Turchik & Garske, 2011)
STD	Sexually transmitted disease
STI	Sexually transmitted infection
WCST	Wisconsin Card Sorting Task (Grant & Berg, 1948)

Abstract

Thesis Title: From Measurement to Intervention: Key Factors Contributing to Risky Sexual Decision-Making in Adults

Student: Shauna Glennon

Risky sexual behaviour (RSB) has been identified as a major public health issue, consequences of which include transmission of sexually transmitted infections (STI) and unplanned pregnancies. From 2019-2023, rates of STIs increased by 31%, according to the Health Protection Surveillance Centre. Evidence suggests the mechanism underlying decision-making in sexual behaviour that interventions from a public health and education perspective should be specialised. As such, the aim of this programme of research was to deepen the current understanding of sexual behaviour and decision making, and its impacting factors. A systematic review assessing the suitability of current paradigms for the measurement of sexual decision making informed the procedure for a longitudinal, cross-sectional study investigating the impact of state and trait variables on sexual decision making. The relationship between risky sexual behaviour and sexual arousal was measured over a month. Findings indicated that state variables were most impactful on self-reported risky sexual behaviour, and that delay discounting was not associated with levels of risky sexual behaviour. The second study measured the impact of public health materials on sexual decision making, taken from the HSE's Sexual Health and Crisis Pregnancy Programme's (SHCPP) digital sexual health campaign. The third empirical study assessed experiences of sexual education, knowledge of STIs, sexual communication self-efficacy, sexual attitudes and level of sexual risk. These results can provide novel and vital insights into the factors which can be shaped from a public health perceptive, to lessen the exposure of individuals to sexual risks.

Chapter 1. Introduction

1.1 Introduction to Current Study

The research reported in this doctoral thesis comprises a systematic review of the literature evaluating decision making in the context of sexual behaviour, as well as three empirical studies evaluating the impact of various constructs on sexual behaviour and associated decision making. The aim of the systematic review, as reported in Chapter 2, was to compile and synthesise research that had been conducted on decision making in sexual domains, particularly amongst young people aged 18-30, in order to identify the most suitable methods of evaluating decision making in this context and synthesise findings from previous research. The empirical research reported in Chapters 3-5 evaluated the impact of variables, some of which with particular relevance to public health policy and sexual education, that are associated with sexual behaviour in everyday life. These variables of interest include state and trait variables, public health materials, social skills, and experiences of education. The overall aim of this thesis was to produce a body of research with clear implications for sexual education and public health policy as it pertains to sexual health.

The purpose of the current chapter is introductory in nature, as it will provide the essential context, both nationally in Ireland and internationally, for decision making in sexual domains.

1.2 Sexual Health & Wellbeing

Health is a state of physical, mental and social well being, and is not merely the absence of illness or disease (World Health Organisation [WHO], 2024). Health can be impacted by behaviour in a number of ways; for example, through behaviours which aim to reduce the spread of communicable diseases, such as vaccination or mask wearing, or

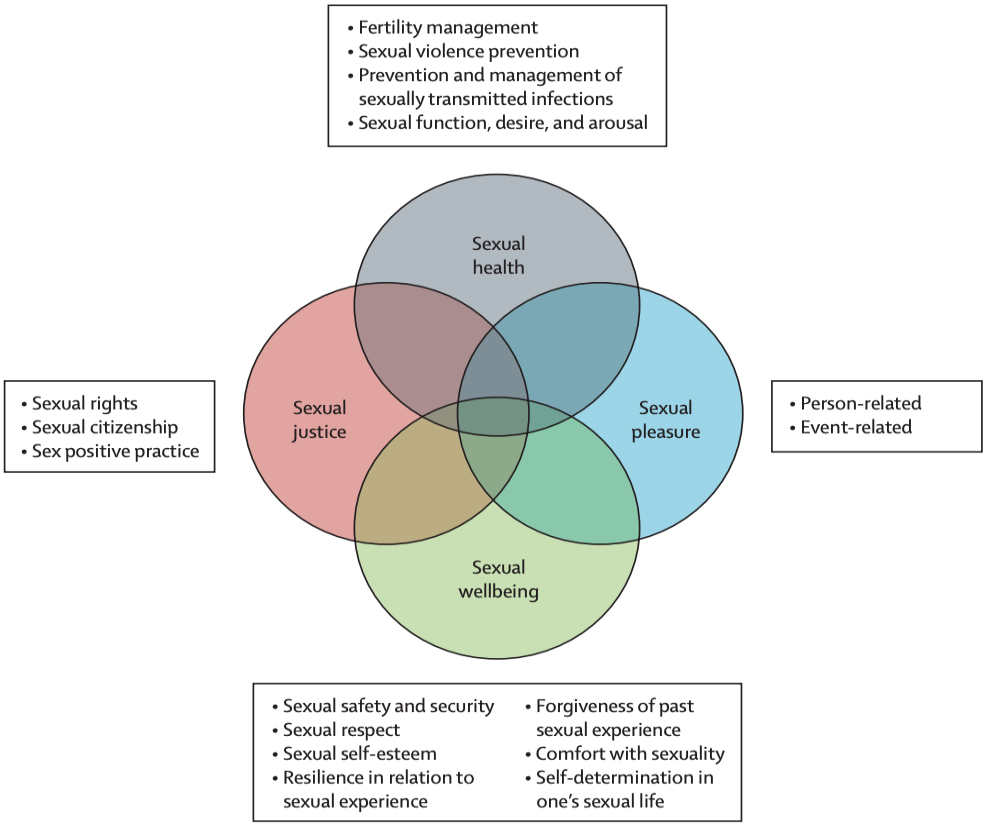
through the modification of risk factors to prevent the development of illness or disease, such as smoking or exercising regularly (Conner & Norman, 2017). Many of the prominent issues presenting in global health today, such as obesity or some chronic illnesses are complex and multifaceted, often caused by a combination of biological, social, genetic, behavioural and environmental factors (Lee et al., 2019). Much like health generally, sexual health is not merely the absence of disease or dysfunction, it is multifaceted and complex. The World Health Organisation (WHO) defines sexual health as a state of physical, emotional, mental, and social well-being in relation to sexuality (WHO, 2006). While there are many ways to be sexually healthy, avoidance and prevention of sexually transmitted infections (STIs) receives a large focus in the literature on sexual wellbeing (Mitchell et al., 2021). This approach comprises a biomedical view of sexual health (Toskin et al., 2020). Other approaches to sexual health include a salutogenic approach, which comprises the analysis of factors which strengthens an individual's resources and empowers them to positively increase their health, even in the face of stressors (Hewis, 2023). Sexual health is distinct from sexuality and sexual wellbeing. In Mitchell and colleagues' conceptualisation of a comprehensive public health approach to sexuality (see Figure 1.1), they adopt a definition of sexual health which mirrors key issues identified by the WHO, including fertility regulation, prevention, and management of STIs, sexual violence prevention and sexual functions (arousal and desire). The WHO Working Group for Operationalising Sexual Health has also acknowledged the synergistic overlap between sexual and reproductive health; these overlaps include safe abortion care and contraceptive counselling and provision (Stephenson et al., 2017). They also note the central objective of the framework (seen in Figure 1.2 below) is to contribute towards physical, emotional, mental and social wellbeing in relation to sexuality.

Sexual wellbeing on the other hand, encompasses aspects of sexuality such as sexual safety and security, sexual respect and self-esteem, resilience in relation to past

sexual experiences, and self-determination and comfort in one's own sex life, according to the framework put forward by Mitchell et al. (2021). Sexuality is an even broader concept within our lives, which encompasses sex, gender identity, sexual orientation, pleasure, and intimacy (WHO, 2006). It can be expressed through fantasies, desires, thoughts, attitudes, roles, and relationships (WHO, 2006). Mitchell and colleagues stated that the value of operationalising sexual wellbeing as a concept distinct from sexual health is of ultimate importance to public health. They argued that issues comprising sexual wellbeing can indicate measurable differences in equities related to sexuality and sexual expression and can provide a meaningful indicator of wellbeing at a population level. A review of sexual wellbeing definitions by Lorimer et al. (2019) noted the concept of sexual wellbeing offers a broader conceptualisation of sexuality compared to sexual health, but noted a lack of a common understanding across the literature of what sexual wellbeing is.

Figure 1.1

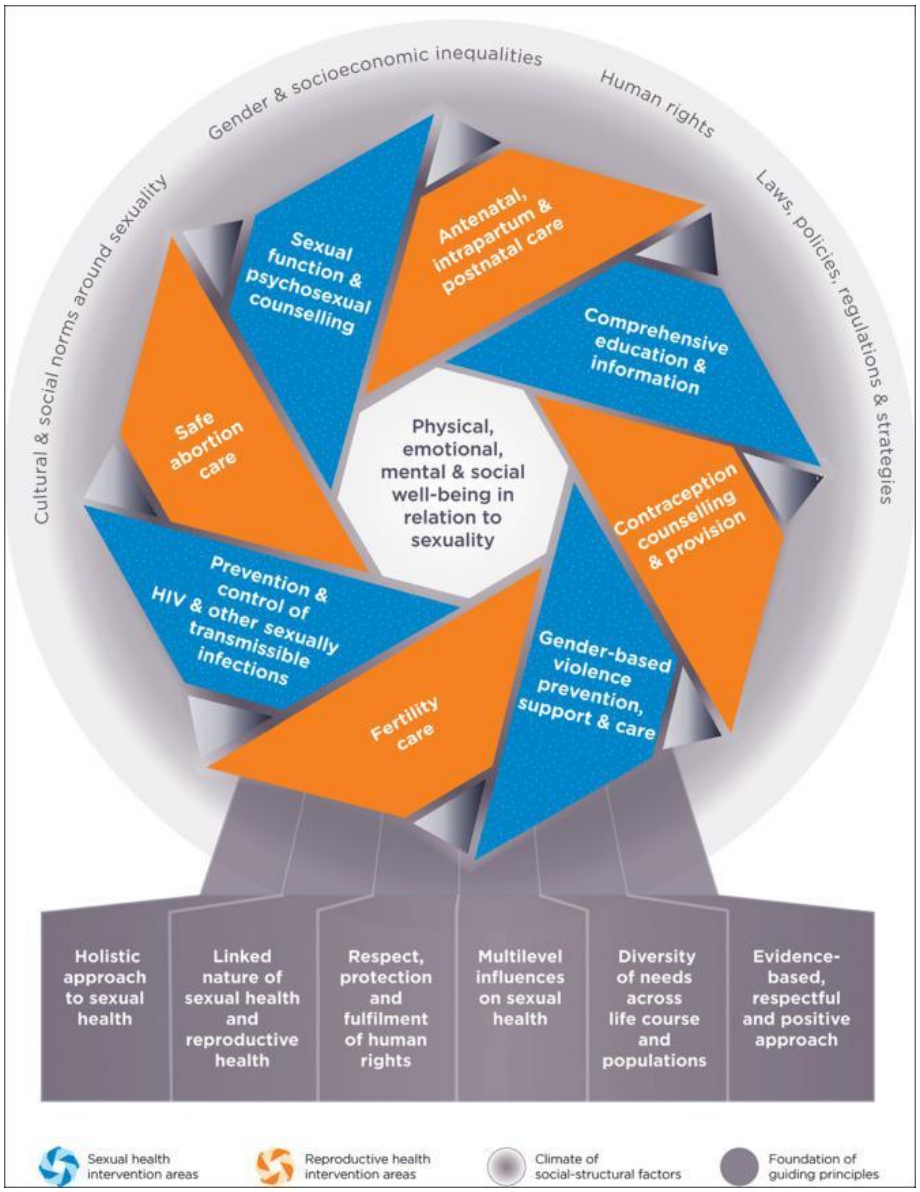
Four pillars of comprehensive public health relate to sexuality.



Note. This model was produced by Mitchell et al. in 2021, conceptualising four pillars of comprehensive public health focused investigation and intervention relating to sexuality. From ‘What is sexual wellbeing and why does it matter for public health?’ by K.R. Mitchell, R. Lewis, L.F. O’Sullivan, J.D. Fortenberry, 2021, The Lancet Public Health, 6(8), e609. Copyright 2021 by Elsevier.

Figure 1.2

WHO framework for operationalising sexual health and its commonalities with reproductive health.



Note. This model was produced by Stephenson et al. in 2017, operationalising sexual health and its commonalities with reproductive health. From ‘Detangling and detailing sexual health in the SDG era’

by R. Stephenson, L. Gonsalves, I. Askew, L. Say on behalf of the WHO Working Group for Operationalizing Sexual Health, 2017, The Lancet, 390(10099), p1014. Copyright 2017 by Elsevier.

1.2.1 Sexually Transmitted Infections

As stated previously, a large focus in both the literature on sexual health and in public health policy, is on the prevention and avoidance of STIs (Mitchell et al., 2021). The term STI is often used interchangeably with STD, meaning sexually transmitted disease (CDC, 2024). A goal of public health is to prevent and treat the infections before they become diseases, as such, the term STI is used most often (CDC, 2024). STIs are caused by bacteria, viruses or parasites and are spread primarily through sexual contact (CDC, 2024). STIs can present with or without symptoms, and if left untreated can cause infertility, chronic pelvic pain and miscarriage (Tuddenham et al., 2022). The fact that STIs can often be asymptomatic necessitates the need for regular STI testing when engaging in sexual behaviour with new sexual partners, and this is often highlighted in sexual health campaigns.

STIs are communicable diseases, and can be prevented and treated (CDC, 2024). Transmission of STIs can be reduced through a variety of methods: using physical barriers during sexual activity, such as condoms or dental dams, the use of medications such as pre-exposure prophylaxis (PrEP; used to prevent HIV) and in some cases vaccines are available. Treatments for STIs can vary, though they usually take the form of an antibiotic. In the case of HIV, PEP (post exposure prophylaxis) is commonly prescribed. In fact, where HIV has been transmitted but treated effectively using PEP, the individual's viral load can become so low that the virus is no longer detectable, meaning they can no longer transmit it to somebody else. This is the key premise of U=U (undetectable = untransmittable), a global campaign that has emerged in previous years as a means of combating HIV stigma. Where an individual has been exposed to syphilis or chlamydia

during unprotected sex, doxycycline post-exposure prophylaxis (doxyPEP) can be prescribed, and has recently been made available in Ireland (HSE, 2024).

There has been a renewal of focus on STIs internationally over the past number of years, due to a consistent rise in rates of STI diagnoses and transmission. STIs have been identified as a major global health issue, with associated reproductive, physical and mental health consequences (National Academies of Sciences, Engineering and Medicine, 2021). In the US it has been estimated that in 2018, 1 in 5 people living in America had an STI at any given point during the year (Kreisel et al., 2021). Between 2014 and 2018, there was an estimated 71.4% increase in primary and secondary syphilis. In a paper published in 2021, it was estimated that incident STIs in the US cost $15.9 billion in discounted, lifetime direct medical costs (Chesson et al., 2021). While the rates and burden of STIs have been increasing in recent years in the US, the Centers for Disease Control and Prevention (CDC) reported an overall decrease in diagnoses of STIs in 2023. In particular the prevalence of syphilis declined for the first time in over 20 years, and there was a 13% decrease in syphilis in gay and bisexual men for the first time since the year 2000, when the CDC first started tracking STI trends among this cohort. Despite this positive change in the pattern of STI diagnoses, there were still more than 2.4 million individuals diagnosed with STIs in the US in 2023, and the CDC identified that there are groups disproportionately impacted by certain STIs, such as adolescents and young adults, men who have sex with men (MSM), and non-Hispanic Black or African American people (Centers for Disease Control and Prevention, 2024).

1.3 Sexual Decision Making

In order to address public health issues such as STIs, the process of decision making, as well as the context in which these decisions occur, must be understood so that a more protective type of decision making can be encouraged. Then in theory, this more

protective type of decision making would lead to a reduction in the public health issue, in this case STIs. Humans do not always make logical decisions or decisions that will benefit them in the long-term (Kelly & Baker, 2016). This can lead to actions that are detrimental to the individual, as such decisions can impact upon a variety of factors, including their health and wellbeing. One reason for this flaw in our decision making is relatively straightforward; we often make decisions in contexts that are emotionally salient, and that require consideration of many factors, and such factors complicate the process of decision making (Ferrer & Mendes, 2017). Behaviour does not occur in a vacuum; behaviour, including health behaviour, occurs in social environments, and the impact of political, economic and affective factors are significant, yet are often overlooked in research on decision making (Kelly & Barker, 2016). This can become particularly salient in health contexts, as receiving information relating to our health and mortality can often activate an affective response, and there may often be a tension between what is gratifying in the short term and long-term health consequences. There have been efforts to understand and change health decisions and behaviour, which have resulted in the development of theoretical frameworks and models that take factors such as risk perception, attitudes and social norms into account in the decision-making process, but yet still ignore the impact of affective factors (Ferrer & Mendes, 2017).

STIs are preventable through modification of risk factors (Kerr et al., 2013), therefore it is of interest to public health to encourage decision making that mitigates these risks. Despite its similarity to other areas of health behaviour, there is evidence to suggest that the mechanisms underlying decision making in sexual health behaviour represent a unique form of decision making. For example, it is distinct from decision making relating to that of other health behaviours, such as deciding to be screened for types of cancer or adhering to medication, because it requires varying degrees of awareness of other people (O'Dell et al, 2008). In fact, prevention altruism, a term coined by Nimmons (1998), is

defined as ‘the values, motivations, and practises of caretaking in one’s sexual behaviour, which arise out of a concern for others’, and is often used in the literature on HIV transmission (p. 78). Much like as was described earlier in this chapter, this type of behaviour has been linked to risky or impulsive decision making whereby individuals are aware of the risk of engaging in unsafe sexual practices but do so anyway in order to receive immediate gratification. However, in this case, people not only dismiss the potential harm that may be caused to themselves, but also dismiss the harm that may be done to their sexual partner/partners. Therefore, the decision-making process in sexual behaviour may be more complex than other types of decision making, and as such, may require more in-depth measures in order to accurately capture the process of such decision making.

It is also important to differentiate between types of sexual decision making; firstly, the difference between the types of decision-making involved in consensual sexual contexts and non-consensual contexts. Decision-making in coercive sexual behaviour could potentially incorporate a range of other factors and behaviours, such as abuse, violence, aggression, and manipulation, all of which are outside of the scope of the current thesis. This programme of research is investigating how participants evaluate health risks posed to them when making decisions in sexual contexts, as opposed to investigating how participants make sexual decisions that will provide the most sexual satiation.

1.4 The Irish Context

1.4.1 STIs in Ireland

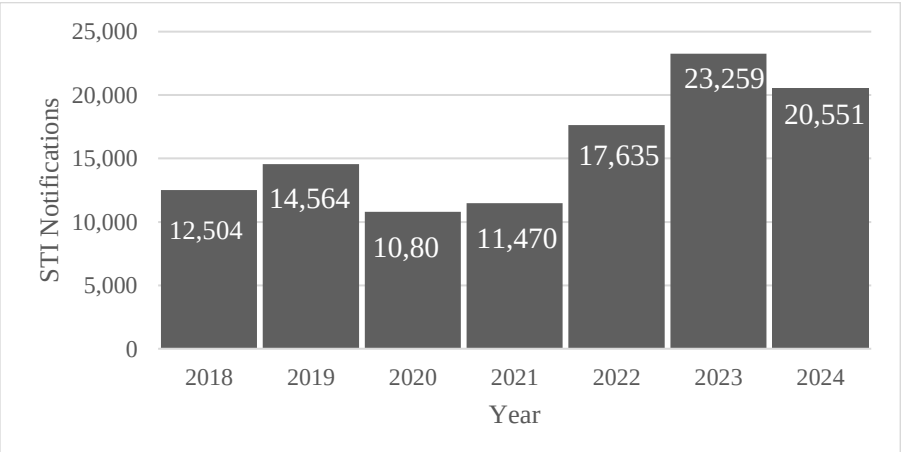
The most common STIs in Ireland are chlamydia and gonorrhoea (HPSC, 2025). Rates of STIs grew steadily from 2019-2023, according to data published by the Health Protection Surveillance Centre (HPSC). While there has been a decrease of 10% in the diagnosis of STIS overall in 2024 compared to 2023, there have still been increases in

certain STIs, such as herpes simplex, HIV and syphilis. Interestingly, trichomoniasis increased by 301% in 2024, compared to 2023 (HPSC, 2025). The decreases have been noted in chlamydia and gonorrhoea, perhaps due to an increase in awareness of these STIs as a result of more prominent public health messaging. The impact of such messaging will be explored in more detail in Chapter 4. It is also important to note that this is the first time since 2019 that an overall decrease in STI diagnoses has been observed within Ireland (HPSC, 2025).

As can be seen in Figure 1.3 below, even pre Covid-19 pandemic rates of STIs were gradually increasing. In 2019 it was reported by the Irish Times that incidents of HIV in Ireland were twice the European average. Naturally in 2020, rates dipped, likely due to the impact of social distancing as well as disruptions in STI testing availability. It is important to note that the jump in STIs visible in the years following 2020, may be due in part to the free home STI testing service that was established between 2021-2022. However, it is unlikely to be the only reason, due to a similar pattern in the rise of STIs among other European countries. Overall, there has been a reported 56% increase in rates of STIs between 2018-2023, but as stated above this pattern has changed since. Further information relating to STI knowledge and determinants of sexual risk will be explored in Chapters 4 and 5.

Figure 1.3

Number of STI notifications between 2018-2024



Note. Data taken from the Health Protection Surveillance Centre STI Reports 2018-2022

1.4.2 Changing Cultural Landscape

There have been rapid developments in the landscape of sexual health for young Irish people over the last number of years due to many factors, including an increase in notifications of STIs (HPSC, 2025), increased access to sexually explicit material including pornography (Nolan & Smyth, 2024), and sexual health information being more readily available online (Patterson et al., 2019). The past number of years have also seen cultural changes. For example, the influence of the Roman Catholic Church, which heavily impacted provision of services and cultural norms surrounding sex and relationships in the 20th Century, has continued to decrease over the past number of years (Parker et al., 2009). Increased visibility of specific demographic groups has also rapidly changed the context of sexual health in Ireland in recent times. The growing migrant population in Ireland experiences specific risks to sexual health, due to barriers to access of sexual and reproductive health services (Crowe, 2023). Strategies which continue to minimise the spread of HIV have also taken effect in the past number of years in Ireland, with the free provision of PEP and PrEP to at-risk groups. Despite this, gay and bisexual men who have sex with men (gbMSM) continue to experience disproportionate STI risks (HPSC, 2024). The combination of these factors has created a complex cultural landscape within which young adults engage in sexual behaviour in Ireland.

Sexual health research that has been conducted elsewhere may provide valuable insights and findings which can be applied to Irish populations. While there are differences across Europe in the accessibility and availability of sexual healthcare (Tsiapakidou et al., 2025), there are some similarities to the Irish landscape in factors which impact sexual health. For example, there are similar sexual health risks to demographic groups such undocumented migrants (Mandroiu et al., 2024;. There are also broad similarities in the sociocultural factors which impact sexual health, such as religion (Parker et al., 2009). As

such, research conducted within Europe may provide some useful insights to the Irish context.

Research conducted on populations from the United States may also offer useful insights and comparisons for Irish populations. However, within the USA there is wide heterogeneity in access to public services such as healthcare and education. These issues in access are often aggravated by additional cultural biases which can vary widely from state to state, such as racial inequality, and increased hostility towards LGBTQ+ populations. As such, findings from research conducted in the United States may not apply as readily to the Irish context.

1.4.3 Sexual Health Behaviours in Ireland

A recent report published by the ESRI reported that knowledge of STI prevention methods was reasonably high amongst young people aged 20, with over 80% correctly identifying condoms as the best means of STI prevention (Nolan & Smyth, 2025). While the majority of participants reported consistent condom use during sexual activity, a sizable portion of respondents reported not always using condoms or other forms of contraception when having sex (nearly 40% of men and 32% of women). Formal and informal sexual education had little impact on sexual health literacy, and sexual health literacy had very little impact on condom use. Peer culture and relationship status appear to be much more impactful on sexually protective health behaviours. In a report published by the Health Service Executive's (HSE) Sexual Health Programme in 2025, 64% of participants reported that minimising the risk of giving or receiving an STI is an extremely important aspect of their sexual health (HSE, 2025). Responses to this survey also indicated that 55% of people had never taken an STI test (HSE, 2025). The review concluded that knowledge pertaining to STIs, and pregnancy prevention were relatively good, with some addressable gaps in knowledge. However, the report notes a discrepancy

between knowledge and protective sexual health behaviour, such as consistent STI testing and a high proportion of young people engaging in condomless sex.

1.4.4 Ireland's Public Health Approach to Sexual Health and Wellbeing

Ireland's first national strategy for sexual health was published in 2015 and aimed to improve sexual health and reduce negative sexual health outcomes (Department of Health [DoH], 2015). This strategy, which lasted until 2020, oversaw many positive developments in sexual healthcare provision in Ireland, including the provision of sexual healthcare services such as free contraception (for women aged 17-35) and the provision of a national home STI testing service. The National Condom Distribution Service, which provides free condoms through sexual healthcare service providers, was also established during this strategy for sexual health (NSHS, 2015). However, despite the advancements made during this time, rates of STIs continued to rise, indicating the need for further development of the strategy and other governmental approaches to reducing the spread of STIs. Furthermore, findings from McConnell et al. (2021) revealed that there may be a level of misinformation amongst young people as to the STI protection offered by certain methods of contraception, including emergency contraception and withdrawal (pull out method/coitus interruptus). Similarly, a report published by the HSE in 2025 revealed when asked to select methods effective at preventing STI transmission, 4% chose withdrawal and 6% chose emergency contraception, despite these methods having no effect on STI transmission (HSE, 2025). Furthermore, 16% of participants believed the withdrawal method was an effective form of contraception (HSE, 2025). As such, there may be a need for future strategies to address sexual education and the provision of high quality and accessible resources on contraception and STI protection methods. There is also a need for research to be conducted in Ireland which can paint a clearer picture of sexual health knowledge.

A review of the NSHS published by Crowe in 2023 reported a number of pertinent findings. The report noted the significant progress made by the NSHS 2015-2020, but commented on the need for a specific Model of Care (MoC) for sexual health in order to ensure the continued provision of robust sexual healthcare services, and to ensure that such a model is led by a high-quality evidence base (Crowe, 2023). This MoC has been integrated into the new NSHS 2025-2035, with the DoH highlighting the need for a HIV specific MoC in order to eliminate new HIV transmissions by 2030 (DoH, 2025), in line with the 'Fast-Track Cities' initiative signed by Ireland in 2019 (HIV Ireland, 2019). Both the Crowe review and the updated NSHS note the importance of engaging with vulnerable groups, including young people, gbMSM, gay and bisexual women who have sex with women (gbWSW) and transgender and gender non-conforming (GNC) people (Crowe, 2023; DoE, 2025).

1.5 Risky Sexual Behaviour

As has been explored in Chapter 1, sexual health is of significant concern to public health. While sexual health can be defined as more than just the presence or absence of disease and dysfunction, the presence of disease remains an area of significant concern to public health. Indicators of poor sexual health have emerged as a prevalent public health issue, both in Ireland and internationally (Crowe, 2023; National Academies of Sciences, Engineering and Medicine, 2021). Engaging in sexually risky behaviours can expose an individual to sexually transmitted infections, such as chlamydia, gonorrhoea, or genital herpes, the three most common STIs in Ireland in 2025. Risky sexual behaviours can include sex unprotected by physical barriers, such as dental dams or hormonal contraceptives, engaging in sexual behaviour whilst under the influence of alcohol or mind-altering substances which can increase tendency towards impulsive decisions, or having multiple concurrent sexual partners (Nappa et al., 2022). Behaviours involving sexual risk can result in unplanned pregnancies and transmission of STIs (*Sexual Risk*

Behaviors | DASH | CDC, 2024). Therefore, curbing the prevalence of RSB is of interest to public health and associated stakeholders, as, in theory, reducing RSBs should reduce the transmission of STIs.

1.5.1 Factors Impacting Sexual Risk

1.5.1.1 At Risk Groups. Young people perceive their risk of contracting STIs as being low, yet young people experience higher rates of STIs and barriers to sexual healthcare, compared to other age cohorts (Riddell et al., 2024). A protective sexual behaviour that is often targeted in sexual health interventions is the use of physical barriers during sexual behaviours, such as condoms or dental dams. Obstacles to young people accessing sexual protection can include the financial cost. A paper conducted in UCC reported that cost influences contraceptive choice amongst sexually active college students, with condoms being used by just 55% of those surveyed. 9.1% of those surveyed used coitus interruptus and interestingly, of that cohort, 40.5% believed that coitus interruptus protected them against STIs, indicating misinformation may be a barrier to the effective use of protection amongst young people (McConnell et al., 2021).

Sexual and gender minorities have also been identified as an at-risk group, though this group is diverse, and different issues are more prevalent amongst certain sub cohorts. For example, it has been noted by the HSPC in Ireland that certain STIs disproportionately impact gbMSM (HPSC, 2025). The CDC reports a similar vulnerability in the US; however, they also remark that the disparity is unlikely to be caused by behaviour alone, rather that it reflects an imbalance in access to healthcare (CDC, 2024). An opposite pattern can be observed amongst lesbians, where lesbian women and their healthcare providers are often unaware of the specific risks of STI contraction amongst gay and bisexual women who have sex with women (gbWSW), as they are at risk of certain STIs (Takemoto et al., 2019).

Other health issues related to sexual behaviour can also be more prevalent among sexual and gender minorities; for example, in a study comparing sex-related substance use in sexual minorities, it was reported that bisexual individuals engaged in the highest rates of sex-related substance use (Taggart et al., 2019). The authors posited this may be because bisexual individuals experience distinct stressors within sexual minority as well as heterosexual communities, which may result in a higher rate of substance use in order to deal with a heightened fear of rejection. Bisexual women have also been reported to experience higher levels of psychological distress than heterosexual women (Kelley et al., 2018). A systematic review reported that while international guidelines for sexual health that include reference to lesbians normally mention the importance of using physical barriers, none of the guidelines actually describe how to use the barriers (Takemoto et al., 2019). Combining this with the fact that barrier use (condoms and dental dams) is reportedly quite low amongst lesbians, it cannot be assumed that knowledge about safe sex practises is common among this cohort.

Minority stress theory helps to provide further context as to why sexual and gender minorities experience disproportionate burden of negative sexual health outcomes. This theory posits that sexual health disparities exist as a result of increased stress experienced by stigmatised minorities (Meyers, 2003). The theory describes distal stressors and proximal stressors; distal stressors originate from people or institutions, and include discriminatory policies, chronic stressors (for example, living in poverty) and everyday experiences of discrimination (Meyer, 2003); proximal stressors arise from socialisation processes, leading to internalised stigma, expectations of rejection and identity repression. The theory underlines that minority stress is distinct from general stress that all people experience. The added burden of minority stress in the lives of sexual and gender minorities posits this community as being at a greater risk of negative health outcomes than

cisgender, heterosexual populations (Frost and Meyer, 2023). The intersection of minority stress with emotional affect will be explored in more detail in Chapter 3.

Certain STIs also disproportionately impact women and people assigned female at birth (AFAB), due to variances in anatomy between males and females (Van Gerwen et al., 2022). This pattern also intersects with the risks of younger adults; the HPSC reported that in 2023, among those aged 20-24 diagnosed with chlamydia, rates were 66% higher in females than in males. Females aged 20-24 were also most affected by herpes in 2023. Women can also experience difficulties in some of the more social aspects of sexual behaviour, for example, in a study which investigated sexual communication self-efficacy skills in young people, a distinct gender difference was reported, such that the scores of young women were much lower than that of men (Quinn-Nilas et al., 2016).

If appropriate care is not taken however, assumptions can be made within healthcare about certain cohorts leading to stigma and stereotyping, which circularly leads to more barriers against testing and other protective behaviour. For example, gbMSM can often be broadly mischaracterised as a group that engages in sexual activity that is inherently risky, and this generalisation can lead to problematic and regressive outcomes, as was seen during the inaction that led to the HIV/AIDS epidemic during the 1980s. Therefore, it is important to note that while certain activities and risks may be more prevalent in certain groups, these issues are often quite complex, and care should be taken to avoid stereotyping or stigmatisation. It has been commented in previous research that transmission of STIs is generally due to sexual behaviours, rather than it being inherently part of a sexual orientation (Takemoto et al., 2019). However, when viewing risk factors in sexual health from a public health standpoint, it can be useful to look at the use of tailored interventions with identifiable groups rather than focusing on a group of behaviours. It has also been noted in previous research that dichotomising sexual orientation into heterosexuals vs. non-heterosexuals in research obscures the nuance of differences within

sexual minority subgroups (Taggart et al., 2019). Therefore, within this current programme of research, differences between sexual and gender minority sub cohorts will be fully explored where possible, rather than all subgroups being treated as one homogenous group. Care will also be taken to avoid broad characterisations and stereotyping of gender and sexual minority groups.

1.6 Factors that Promote Sexual Health

As established by the WHO, it is imperative that governments take responsibility for ensuring the provision of adequate healthcare and social measures, in order to promote the health of its people (WHO, 1948). In an Irish context, a key aim of the Health Service Executive, which manages all of the public health services in Ireland, is to ensure that people in Ireland are supported by health and social care services, and to have access to compassionate and high-quality care when needed (HSE, 2025). In 2013, the Irish government launched the 'Healthy Ireland' initiative, a national framework designed to improve the health and wellbeing of people living in Ireland (HSE, 2023). The development of this initiative came as a direct response to increasing chronic health issues, health inequalities and the persistence of lifestyle factors that negatively impact upon the lives of those living in Ireland. A key aim of the Healthy Ireland initiative is to focus on the prevention of illness and address the essential areas where health and wellbeing are most impacted (HSE, 2023). As such, the initiative is broad and far reaching, with aims to utilise government departments, businesses, organisations, communities and individuals to improve national health and wellbeing. Healthy Ireland initiatives have included sun safety campaigns, mental health and wellbeing, programmes to reduce alcohol consumption, and an increase in sexual health and wellbeing resources (HSE, 2023), through the development of the Sexual Health and Crisis Pregnancy Programme (HSE, 2015). The Healthy Ireland framework also acknowledges the interconnectedness between public

health and other important social outcomes, such as education, employment, and social protection.

1.6.1 Public Health Campaigns

Governmental departments and other associated agencies often choose to promote safer decision-making and behaviour through a series of activities and interventions. Their programme of action is typically focused on either primary or secondary prevention. Primary prevention refers to actions that aim to prevent disease before it ever occurs, whereas secondary prevention refers to reducing the impact of disease that has already occurred (Institute for Work & Health, 2017). Health campaigns and health programmes are often utilised as part of primary and secondary prevention efforts in sexual health, in order to both prevent STIs and their proliferation in a population. Campaigns are often seen as strategic communications and marketing activities. Health campaigns are typically time-limited and focused efforts to address specific issues within specific populations (Friedman et al., 2016). Campaigns are an important strategy to address high-priority diseases across different geographic areas (Health Campaigns and Campaign Effectiveness, 2020). A health programme on the other hand, is a more sustained and structured set of activities, typically involving multiple interventions and designed to achieve broader, long-term health goals.

While this thesis is concerned with sexual health specifically, and Chapter 4 will delve into the efficacy of public health materials pertaining to sexual health, there are important learnings and insights that can be garnered from the literature on general public health campaigns. Although a number of public health campaigns have proven effective, it has been noted that policy makers often commit a variety of errors when developing campaigns designed to motivate public health behaviour (Kelly & Barker, 2016). These errors have detrimental impacts on the efficacy of health campaigns. One such common error is the assumption that increased knowledge and information alone will motivate

meaningful and consistent behaviour change. For example, numerous attempts to reduce consumption of alcohol in Ireland have been made over the past number of years, including the introduction of minimum unit pricing (Department of Health, 2022). Yet still in 2019, every person aged 15 and older drank on average 10.8 litres of pure alcohol a year, with Ireland ranking 8th in the world in monthly binge drinking (Health Research Board, 2021). Looking specifically at sexual health campaigns, despite an increase in the awareness of safe sex practices, and an increase in the availability of protective options over the past number of decades, as of 2024, there were 40.8 million people living with HIV worldwide (UNAIDS, 2025).

Another common error of public health campaigns put forward by Kelly and Barker (2016), is the assumption that changing health behaviour is simply a case of getting the messaging right, an idea borrowed from commercial marketing (Kelly & Barker, 2016). As was seen in Ireland over the past two decades, there have been decreases in rates of tobacco use and smoking. This reduction was observed following an emotive campaign towards teenage smoking (Oireachtas, 2003), which purported the idea that smokers were unattractive. At the same time, there was also deliberate governmental effort to shift the culture around smoking, as evidenced by the 2004 Public Health (Tobacco) Act which prohibits smoking in all workplaces, bars and restaurants. According to the HSE, a 9% decrease in smoking was observed from 2004-2024 (HSE, 2024). Similarly, the UK's health promotion response to the HIV epidemic in the 1980s benefitted from insights from advertising. However, its success did not hinge on this alone. Rather the success of this campaign was as a result of a multi-pronged approach, bringing together effective and clear public messaging, with multimedia campaigns in order to successfully combat the HIV epidemic. Evidently, public health campaigns can be successful in motivating protective health behaviour, but in some cases, there is a failure both to understand and motivate more protective behaviour. Therefore, it is worth investigating the nature of

decision making in this domain, and what other factors impact upon this decision-making process.

Previous programmes and campaigns in Ireland promoting different aspects of sexual health and wellbeing have seen some success. Rates of STIs decreased in Ireland in 2024 by 13%, which could be in part due to a focused digital campaign by the HSE's Sexual Health and Crisis Pregnancy Programme (SHCPP), which underscored high rates of STIs and the importance of using condoms during sexual activity. Other successful programmes have also been initiated in Ireland, such as a national PrEP (pre-exposure prophylaxis) programme which was introduced in January 2019. As part of this programme, PrEP is available free of charge to groups considered to be at risk of HIV. Subsequently, the HSPC reported in 2022, 3,388 individuals had availed of free PrEP prescriptions, and 1,240 were new PrEP users. In January 2020, the SHCPP launched a campaign to combat stigmatisation of HIV specifically, which has been identified as a barrier to STI testing (Balfe et al., 2010). The campaign heavily referenced the global U=U campaign that has emerged over the past number of years, meaning that once a person living with HIV has an undetectable viral load as a result of effective treatment, they cannot transmit HIV. The aim of the campaign was to highlight the importance of treatment for people living with HIV, and to eliminate fear of transmission amongst those who are living with HIV. Treatment for HIV includes PrEP which prevents HIV, and PEP (post-exposure prophylaxis) which is taken following exposure to HIV. This campaign was developed in consultation with stakeholders, and advertisements were targeted towards young people. However, despite these strides that have been made in sexual health policy, HIV and other STIs remain a significant public health issue, indicating the need for further high-quality data to continue to progress public policy in this area.

When looking at what exactly makes a campaign effective with a targeted group, there is some guidance from the literature. Pedrana et al. (2014) evaluated gay men's

reactions to an Australian HIV/STI prevention campaign. They reported that the most appealing aspects of the campaign were the light-heartedness of the messaging, and the direct and target-appropriate language used. This finding has been supported by a systematic review examining the efficacy of sexual health social marketing campaigns (Riddell et a., 2024), which reported that an understanding of the target audience and their specific culture is essential in developing effective sexual health interventions. Previous sexual health campaigns, particularly in the wake of the HIV/AIDS crisis, were fear based. There has been a move in the 21st century to instead use gain-framing and loss-framing messaging in sexual health promotion (Pedrana et al., 2014). While public health campaigns are essential for sharing unbiased, reliable information pertaining to sexual health, they can also be effective in reducing other barriers to protective sexual behaviour, such as stigma. Walsh et al. (2023) reported that among sexual and gender minorities who had been surveyed about PrEP, those who had heard about PrEP through health campaigns reported lower levels of PrEP stigma.

1.6.2 Sex as a Social Behaviour

Sex, as well as being a health behaviour, contains a considerable social component. Sex occurs within a broader social and cultural context, implicating more than just the partners involved in a sexual relationship (Meston & Buss, 2007). Sexual encounters are often composed of interacting interpersonal and social factors. In fact, Meston and Buss (2007) identified some of the most frequently endorsed reasons for having sex, most of which largely reflected motivations of other social behaviours, such as attraction, emotional intimacy, connection, love, affection and romance. Another of the top 50 reasons for engaging in sex was being drunk, indicating there is an intersection between sexual behaviour and other types of risk behaviours (Meston & Buss, 2007).

A variety of social skills are implicated in sexual behaviour. Sexual communication is a commonly cited skill, whereby those who have good quality communication with their

sexual partners experience positive outcomes, such as higher sexual and relationship satisfaction, and benefits for contraceptive use (Quinn-Nilas et al., 2016). Self-oriented feelings, such as self-esteem and self-worth have significant impacts on sexual behaviour, much like they do in other social contexts. Other studies have also acknowledged the importance of social skills, both verbal and non-verbal, including the understanding of diverse power dynamics, and the impact of sexual scripts on behavioural norms (McDaid et al., 2021). Sexual script theory draws upon social learning theory, to describe how people rely upon their social environment in order to develop their internal representation of sexual behaviours and relationships (Gagnon & Simon, 2002). This theory helps to describe the importance of cultural factors in the development of young people's sexuality (Smith et al., 2025). The impact of some cultural factors on sexual risk, such sexual communication and sexual attitudes, will be explored in Chapter 5.

1.7 Measurement and Research Designs Used to Quantify Sexual Risk

As has been explored, decisions in sexual health behaviour have often been linked to types of impulsivities or propensity towards risk (Hofmann et al., 2008). This is due to the fact that people are often aware of the risk of not acting in line with public health advice, yet prefer immediate gratification over expending the effort required to engage in safer behaviour; for example, using the energy to resist the urge to have unprotected sex and wait to procure a condom, even when experiencing a strong urge to do so and acquire immediate gratification. In order to develop interventions to modify sexually risky behaviours, an accurate, reliable, and ecologically valid form of sexual risk measurement must be selected. This section of the chapter will provide an overview of the methodologies used to quantify sexual decision making and sexual behaviour.

1.7.1 Experimental designs

While many experimental paradigms in the domain of sexual behaviour do not directly measure risky sexual behaviour itself, they do measure the decision-making process underlying such behaviour. The results from these paradigms can derive further understanding of what motivates risky sexual behaviour. As such, some of the more common measures of sexual decision making will be explored here.

1.7.1.1 Monetary Delay Discounting. When investigating this type of decision making, paradigms such as delay discounting are often used, as they have proven relevant in providing an understanding of problematic decision making (Johnson et al., 2021). For example, monetary delay discounting (MDD) is commonly used in experimental studies of decision-making (McHugh & Wood, 2008) and involves offering repeated choices between a smaller amount of money immediately or within a short time frame and a larger amount of money, following varying delays (€5 today or €10 in 10 days). Within these types of paradigms, greater propensity to choose the sooner reward has been equated to impulsive decision making (Rung & Madden, 2018), and maps onto other risky behaviours, such as problematic gambling, criminal outcomes and measures of addiction (Mishra & Lalumière, 2016; Amlung et al., 2016). Various types of discounting and risky sexual behaviour (RSB) have been studied extensively over the past number of years; for example, Wainwright (2018) reviewed discounting frameworks that have been related to sexual behaviour, and developed a social discounting measure focusing on condom use [the Condom Use Social Discounting measure (CUSD)]. Lemley et al. (2018) reported that condom use behaviours correlate more closely to delay discounting than probability discounting, indicating that risky behaviour is linked to an inability to delay gratification rather than a propensity to take risks. A systematic review on discounting and sexual behaviour conducted by Johnson et al. (2021) reported that there is a surplus of novel measures which have emerged over the past number of years that address sexual behaviour using a discounting procedure. Recent research has also indicated a domain specificity of

discounting paradigms, such that discounting for sexual outcomes for example, is a better predictor of sexual outcomes than discounting for money (Lawyer & Schoepflin, 2013; Johnson et al. 2021). Johnson and colleagues also noted the populations used in these studies were highly homogenous, mostly consisting of heterosexual college students. The suitability of monetary discounting as a paradigm for measuring sexual decision making specifically, will be explored in more detail in Chapters 2 and 3.

1.7.1.2 The Iowa Gambling Task. While the Iowa Gambling task (IGT) hasn't been investigated to the same degree as discounting, it has been investigated in relation to sexual decision making. In the IGT, participants choose cards from four decks. Over time, participants are able to identify decks which are 'disadvantageous' (that will incur a net loss) and decks that are advantageous (that will incur a net gain) (Buelow & Suhr, 2009). Rather than explicitly learning the 'advantageous' and disadvantageous' decks, participants develop a sense, based on internal markers such as skin conductance, which helps them to identify the good decks from the bad ones (Ursache & Raver, 2015). As part of the 'somatic marker' hypothesis, poorer performance on the IGT identifies individuals who are less effective at detecting these marker signals, and as such are poorer at identifying outcomes of riskier behaviours in their decision making (Ursache & Raver, 2015). Scores on the IGT have been associated with risky behaviours, such as gambling disorder, alcohol use disorder, and drug use (Kovács et al., 2017; Verdejo-Garcia et al., 2007). Rendina et al. (2018) investigated IGT performance and sexual arousal and behaviour in gay and bisexual men. They reported that IGT scores increased strength of the association between sexual arousal and engagement in sexual behaviour, but there was no main effect of IGT scores on sexual behaviour. They also noted that increased IGT scores are not universally associated with safer sexual decision making.

1.7.1.3 Vignettes. Vignettes are an effective experimental paradigm used to measure sexual decision making, as it places participants in a situation where sexual behaviour is desired (Stoner et al., 2007). Vignettes typically describe sexual scenarios to participants and are asked questions either during the vignette or after about the decisions they would hypothetically make if they were in the scenario (Stoner et al., 2007; Skakoon-Sparling & Cramer, 2021). Variables within the vignette are often manipulated depending on what exactly the experiment is attempting to tap into; for example, the sexual partner could be familiar or a stranger (Skakoon-Sparling & Cramer, 2021), the vignette could include information about condom use (Davis et al., 2010), or the scenario could be presented via a written piece or a video (Abbey et al., 2006). Research has found that vignettes are a suitable method for measuring decision making, particularly sexual decision making (Oswalt, 2010). Two limitations with vignettes have been noted however that researchers should aim to avoid; firstly, that vignettes may not portray a scenario that accurately reflects reality, and secondly that participants may answer questions from vignettes in socially desirable ways (Barter & Renold, 2000).

1.7.2 Self-Report Measures

Self-report measures offer a resource-efficient and meaningful way of measuring sexual behaviour across a large sample of participants. Due to the fact that such data collection using such measures can be easily conducted online, they also have the added value of affording responders' anonymity, which may increase honest responses. There have been some concerns reported in the literature that self-report measures may be subjective to response bias, such as social desirability (King, 2022). Frequency measures such as the Sexual Risky Survey (SRS) are often used to quantify sexual risk (Mirzaei et al., 2016). These types of measures ask participants to indicate the number of times they have engage in particular behaviours in a given temporal period. The SRS asks participants 23 items, asking them to estimate how many times they have engaged in various risky

behaviours over the past 6 months. Measures using Likert type responding scale, such as the Safe Sex Behaviour Questionnaire (SSBQ) are frequently used, with high rates of reliability (Mirzaei et al., 2016).

Condom use is commonly used in sexual health literature as an indicator of sexual risk behaviour (Noar et al., 2007). As a result, there are many self-report questionnaires that revolve around condom usage. A review published in 2007 evaluated 72 measures of condom use and remarked that many of the measures quantifying condom use were single item measures and did not take into consideration any other factors which may indicate sexual risk, such as the frequency of sex or the number of sexual partners of an individual (Noar et al., 2007). As such, the authors encouraged that future research utilise multi-item scales when ascertaining condom use and sexual risk. The focus of sexual risk measurement on condom use is explored in Chapter 2.

1.7.3 Qualitative Methods

Qualitative methods have been used to measure risky sexual behaviour, albeit sparingly. As sexual behaviour is a very private behaviour, social desirability can feature heavily in participant responding (King, 2022), that is the need for individuals to obtain approval by responding in a socially acceptable manner. This pattern of responding has even been identified in anonymous, self-report surveys (King, 2022), and as such, qualitative forms of data collection may not be suitable when investigating sexual health behaviour. In interview settings, participants may not feel comfortable disclosing personal information to interviewers, and similarly in focus group settings, participants may not wish to share sensitive information pertaining to their sexual behaviour with other participants. Due to their general unsuitability, qualitative methods will not be fully summarised here.

1.8 Novel Contributions of This Research

Arising from the demonstrated gap in the literature regarding sexual decision making amongst young people, there are a number of novel approaches embedded into this programme of research. These additions will further deepen understanding of the nuance of decision making in sexual contexts across young people.

1.8.1 Inclusive Approach

As evidenced by reports from the DoH (2025) and from the CDC (2024), there are specific groups that are disproportionately impacted by certain STIs, including gbMSM, gbWSW, transgender and GNC people. It is a key objective of this body of research to ensure samples across the empirical studies are inclusive of people of varying sexual orientations and gender identities. This will be done in order to ensure that the results of each study can deepen understanding of how sexual decision making may differ amongst these groups, which can then be used to strengthen sexual health services and public health approaches with these groups.

1.8.2 Differentiation Between Sexual Health and Sexual Wellbeing

Much of the remaining work to be done in the area of sexual health is identifying its relationship to other malleable factors, so that more can be understood about how to motivate decisions in the general populace which will lead to greater sexual health. There is also further work to be done to understand what can be achieved from a public health and sexual education perspective to continue to support people with the skills, knowledge, and resources to engage in sexually healthier behaviours. As has been noted previously, while sexual health and sexual wellbeing are distinct concepts, the terms are often used interchangeably. Previous research also often focuses on indicators of sexual health, to the exclusion of sexual wellbeing, despite the overlaps between the two, as conceptualised by Mitchell et al. (2021). This programme of research clearly distinguishes between the two concepts, and will focus on aspects of sexual health throughout, such as risky sexual

behaviour, sexual decision making, and knowledge of STIs (Chapters 3, 4, and 5). Aspects of sexual wellbeing will be explored in Chapter 6, namely sexual attitudes and sexual communication skills. The purpose of exploring these aspects of sexual wellbeing at that stage is to identify if and how they impact sexually risky behaviour, and as such, sexual health.

1.8.3 Ecological Validity

A novel aspect of this research are the numerous attempts made throughout the research to be as ecologically valid as possible. In order to make effective and relevant recommendations for public health policy and sexual education, there is a need to ensure that the empirical work within this programme of research is valid and is truly measuring key concepts accurately and truthfully. For example, certain aspects of sexual behaviour are dynamic and can be difficult to define, such as sexual arousal. Previous research has recommended that certain measures be used in order to increase the validity of the measurement of such dynamic variables, so that a more accurate measurement of the variable may be garnered over a period of time. This recommendation has been considered, and a longitudinal component was built into the development of the empirical study reported in Chapter 3.

Furthermore, additional components such as a pre-experiment, stakeholder involvement, and an advisory group were embedded into this programme of research, to guide the development and design of the research. The pre-experiment was included as part of Chapter 4, in order to ensure ecological validity and relevance of measures developed as part of that study. Responses from participants were used to guide the development of those measures. An advisory group was established in Chapter 4 in order to bolster the ecological validity of the experimental research reported in that chapter. The group also stood to ensure relevance of the research and its findings for stakeholders in public health and sexual education. Members of the advisory group included the supervisors for this

programme of research, as well as the Research Manager for the SHCPP, a representative from the Healthy Campus initiative, and a representative from the Students' Union in DCU. This group was consulted during the planning of this experiment in Chapter 4 through a number of meetings and communications via email. The group were presented with materials and content pertaining to the experiment ahead of virtual meetings and were given an opportunity to provide feedback during the meetings. The group provided feedback on the design and focus of the experiment, and the design and content of the materials. They also made suggestions for additional vignettes that they felt would be relevant to participants. The group were also presented with the results of the pre-experiment and had an opportunity to provide feedback on the changes made to the experiment as a result of the pre-experiment. The research team was responsible for integrating the recommendations into the experiment.

The SHCPP were also involved in the design and development of Chapter 5. The SHCPP collaborated with the research team on this project to develop novel materials for measuring STI knowledge amongst young people in Ireland. The SHCPP also consulted on the design and objectives of the project, to ensure that the findings would have relevance from a public health perspective. The addition of both the advisory group and the collaboration with the SHCPP specifically supported the ecological validity of this programme of research.

1.9 Research Aims and Objectives

It is clear from the literature reviewed here that sexual health and behaviour is multifaceted and complex. When also considering the mechanisms of decision making, the complexity of making decisions in sexual contexts is compounded. Viewing sexual decision making through the biomedical viewpoint of sexual health is useful. However, focusing exclusively on this component of sexual behaviour neglects the myriad of other

factors that may be useful in motivating a healthy sexuality and empowering people to make healthy decisions in the context of their own lives.

It is the aim of this research to investigate both aspects of sexual decision making; the biomedical approach to the prevention and treatment of STIs, the use of protection, and the evaluation of sexual risk, whilst also being cognisant of the complex and interpersonal social factors that have an impact on decisions made in sexual contexts. It was the aim of this research to marry both viewpoints together, in order to understand more about how people in the modern world make sexual decisions.

1.10 Thesis Outline

Following on from this introductory chapter, Chapter 2 reports paradigms which have been used to quantify decision making in sexual contexts and synthesises the results from these papers. The purpose of this synthesis is to identify experimental paradigms which are most suited to capturing the nuances within sexual decision making. Chapter 3 details the first empirical study, which examined the impact of state and trait variables on risky sexual behaviour. This study also comprised a longitudinal component, investigating the relationship between risky sexual behaviour and sexual arousal over the course of 30 days. Chapter 4 reports an experiment which tested the impact of sexual and general health materials on measures of sexual decision making (which has been identified from Chapter 2), and STI risk perception. Chapter 5 details an extensive survey which measured sexual education, sexual health knowledge, sexual attitudes, and sexual communication skills, and investigated their impact on sexual risk. Finally, Chapter 6 concludes the thesis with a detailed discussion of the findings from across the chapters and explores the contributions of this thesis to our current understanding of decision making in sexual contexts.

Chapter 2.1 Introduction

This chapter presents a review of literature which has measured and experimentally manipulated sexual decision making using quantitative paradigms on individuals aged 18-30. The aim of this review was to synthesise findings from this literature, in order to identify paradigms best suited to identifying domain specific sexual decision making.

2.1.1 Context for this Systematic Review

As has been discussed in Chapter 1, decision-making can be defined as selecting the best option out of a number of available choices (Beach, 1993). Protective decision making in health domains often requires over-riding the desire to choose what is immediately rewarding but ultimately not advantageous in the long term, in order to choose the option which will benefit health over time. In the context of sexual health, this can include choosing whether or not to use protection, such as condoms, other types of physical barriers, hormonal contraceptives or PEP (post-exposure prophylaxis)/PrEP (pre-exposure prophylaxis). It can also include choosing to engage in sexual behaviour with multiple concurrent partners, engaging in regular STI testing, or choosing to engage in sexual activity whilst under the influence of substances which significantly impact decision making capacity, such as drugs or alcohol. All of these options can be characterised as choices which present health vulnerabilities to the decision-maker, as well as to their sexual partner(s).

If an individual chooses to engage in protected sex, this decision may be at the expense of additional resources, such as time, money, and energy. A combination of such factors can complicate the process of sexual decision-making. The short-term consequences of risky sexual behaviour can lead to unplanned pregnancies, or contracting sexually transmitted infections, including HIV, which if untreated can lead to infertility, cancer, and foetal and neonatal deaths (World Health Organisation, 2009). Understanding the process of sexual decision-making is vital to public health, in order to prevent undue

burden on public health services. However, motivating safer sex practices has proved difficult in recent years. For example, STIs cost the American taxpayer $16 billion in 2018 (Weinstock et al., 2021), and rates of STIs increased in Ireland by 31% between 2019-2024 (Health Protection Surveillance Centre [HPSC], 2025). Similarly, the prevalence of HIV remains extremely high in the Global South, with the incidence of STIs increasing from between 46.8 - 67.4 million from 1990 to 2021 (Shahsavand et al., 2025).

As has been explored in Chapter 1, the process of decision making in health domains shares similarities with the process of decision making in sexual domains. Despite these similarities, there is evidence to suggest that the mechanisms underlying decision-making in sexual health behaviour represent a unique form of decision-making. For example, it is distinct from the type of decision-making involved in deciding to be screened for types of cancer or adhering to medication, because it requires varying degrees of awareness of other people (O'Dell et al, 2008). Sex, similarly to food, is a primary reinforcer (Holt et al., 2013), that is, it satiates a biological need. Protective decision making in both sexual and food domains requires an awareness of how one's own behaviour impacts upon others over time. However, the consequences of risky sexual behaviour on one's sexual partners can significantly impact their immediate health and their health over time. Therefore, protective decision making in sexual domains requires an immediate awareness of how behaviour that occurs at this particular moment in time will impact the health of a partner in the future.

Decision-making for sexual outcomes is also distinct from that of monetary outcomes, as money is a secondary reinforcer, that is, it itself does not satiate a biological need, but rather provides the means necessary to procure primary reinforcement. As such, decision making in sexual domains is distinct from that in other domains, including monetary and general health domains, and may require specialised measurement methods

within the experimental literature to capture the complexities of this type of decision making.

Understanding and motivating more protective sexual decision making continues to present challenges for behavioural science (Johnson et al., 2021), and is also reflected in rising rates of certain STIs across Europe and in the USA (CDC, 2023; ECDC, 2024). Previous research that has investigated sexual decision-making has used an array of measures to quantify decision-making in a sexual context, some of which are designed to measure the type of risk specifically included in sexual decision-making, while others measure a general propensity for risk taking instead. Furthermore, it has been noted in recent years that there have been a wide range of measures developed for quantifying sexual decision-making (Johnson et al., 2021). A full review of the measures that have been used to quantify decision-making in this domain has not been conducted, leading to a wide variety of experimental and non-experimental paradigms, all of which may be measuring different constructs, with little understanding as to what the literature collectively tells us about sexual behaviour.

There are many paradigms used to quantify the process of decision-making in this domain. The main paradigm types have been explained in detail in Chapter 1, namely discounting paradigms, vignettes, and gambling type tasks. There are also a range of factors that can impact upon sexual decision-making. As stated in the previous chapter, the specific intersection of gender, sexual orientation and sexual behaviour has received little attention within the literature on decision-making in sexual behaviour. Evidence suggests that specific groups engage in sexual decision-making and process related information in a way that is specific to their population. For example, it has been reported that traditional gender stereotypes can result in Black women feeling less empowered in sexual relationships and may undermine their own sexual well-being in order to ingratiate themselves to male sexual partners (Bond et al., 2021). Other research has indicated that

specific factors have emerged as impacting sexual behaviour in sexual minorities, such as self-hate, early sexual debuts, high number of sexual partners and sexual behaviour while under the influence of drugs or alcohol, which don't impact in a similar fashion upon heterosexual populations (Nappa et al., 2022). Similarly, some experimental paradigms often used to measure decision-making in sexual behaviour have received criticism for only sampling heterosexual college students (Johnson et al., 2021). Therefore, the current literature indicates that previous research on sexual decision-making may not be generalisable to all gender and sexual minorities, as the factors that impact their decision-making in this context may be different to that of heterosexual populations.

2.1.2 Contributions of the Current Systematic Review

This review will compile and synthesise experimental research evaluating decision-making in sexual health behaviour, in order to identify what motivates decision-making in sexual health. The results from our review will aid in understanding why individuals engage with public health advice, and how to increase engagement with it. As mentioned in Chapter 1, there is a need for evidence-based policies, which this review can stand to inform. The information extracted has the potential to inform public policy, particularly as we attempt to reduce the spread of sexually transmitted diseases and infections. The results from this review can also help to identify the optimal paradigms for measuring sexual decision making, in order to homogenise the research and enable more meaningful comparison across the literature. Results relating to sexual decision-making in gender and sexual minorities were extracted, as this information has been omitted from previous research. It is important to note that the paradigms that are included in the review do not have to be specifically measuring sexual decision making themselves, but rather are used by the researchers to understand the decision-making process underpinning sexual decision making.

This review focussed on individuals who bear the heaviest burden of STI diagnoses, namely those between the ages of 18-30 (HPSC, 2017). Some evidence suggests that decision-making operates differently in this cohort, due to the cognitive abilities of the brain not yet being fully developed (Alexander et al., 2015) or just having finished developing. This review also focussed on research that has been conducted in the 21st Century, as the landscape of research on sexual behaviour has changed drastically over the past number of decades, due to the AIDS/HIV pandemic. In order to ensure generalisability of the results of this review, we will also focus on non-clinical populations, excluding papers that feature exclusively on populations with any condition that could alter their decision-making, such as ADHD, as such individuals are reported to have higher rates of impulsivity (Flory et al., 2007). In papers where alcohol or substances are the focus of the study, the study may be included if a control group that has not consumed any substances can be extracted separately.

2.1.3 Review Purpose

Based on the above, the following specific objectives for this systematic review are to:

1. Identify experimental paradigms used to measure decision-making in sexual behaviour in young people.
2. Compare the results from this research in order to determine the most evidenced experimental paradigm(s) for capturing sexual decision-making in young people.
3. Identify factors that have been investigated in combination with decision-making and sexual behaviour.

2.2 Materials and Methodology

The review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.

2.2.1 Search Strategy

Searches were conducted systematically on Scopus, PsycInfo and Web of Science on 9th January 2024. Free text terms were developed based on previous research and consultation with the department librarian and were implemented as part of the search strategy across databases. The full list of search terms can be seen in Appendix A. Searches were adapted to each database in order to accommodate differences between the databases. On Scopus, searches were restricted to searches with the search terms within title, abstract and keywords. Searches on Web of Science were conducted within the Social Sciences Citation Index, as the searches within all editions brought back many irrelevant papers. The search was run on PsycInfo with no differences. Searches were restricted to papers published from 2000-2024. This decision was made as the focus of a lot of sexual health research was vastly different prior to 2000, as a result of the HIV/AIDS epidemic.

2.2.2 Selection Criteria

All studies that mentioned decision-making that occurred in sexual behaviour were targeted for this review. In accordance with PRISMA, the PICOS process was used to report the populations, interventions, comparators and outcomes and study type of the studies to be used in this review, which is outlined in more detail below. Empirical studies were included if they measured decision-making using an experimental paradigm in the context of sexual behaviour. Studies were excluded if they (1) used exclusively qualitative methods, (2) did not measure decision-making using an experimental paradigm, (3) did not describe empirical research, (4) included participants under the age of 18 or over the age of 30, (5) focused solely on a clinical population (i.e. substance use disorder, ADHD, ADD, etc), (6) participants were under the influence of drugs/alcohol for the purposes of the study, (7) if sexual behaviour was not being studied, (8) if sexual behaviour was coercive/non-consensual. See Appendix B for the detailed Inclusion and Exclusion Criteria that was used in this review.

At abstract screening level, some additional terms were taken as indicators of measuring decision making, such as impulsivity, behavioural impulsivity, and if the paper used vignettes but did not necessarily mention sexual decision making as an outcome of interest.

2.2.3 Data Extraction

Once all full texts were retrieved from the databases, the titles and abstracts were imported into Zotero, where all duplicates were removed. Following this, all abstracts were uploaded onto Covidence to begin the process of abstract screening. Screening at the abstract and full text level were independently completed by two reviewers. Any papers that fulfilled the criteria at the abstract screening stage were forwarded to the full text stage, and any papers that did not meet the criteria were discarded. All conflicts between reviewers were resolved through discussion between both reviewers until a consensus was reached. Full text screening was completed on the remaining papers, in line with the criteria described above. Quality assessment was also conducted independently by the same two reviewers. Similarly, any disagreements between the results of the two reviewers were discussed until a consensus was met. The first author extracted the following data from the included articles: (1) author, (2) publication date, (3) country of study, (4) mean age (age range), (5) population, (6) sample size, (7) presence of control group, (8) gender, (9) sexual orientation, (10) study aims, (11) measure of sexual behaviour, (12) description of measure, (13) measure of decision-making, (14) description of measure, (15) measure of alcohol/drug use, (16) description of measure, (17) experimental manipulation, (18) other factors being measured.

2.2.4 Quality Assessment

Both reviewers used Dunne et al.'s (2017), "Quantitative Quality Appraisal Tool" to independently assess the quality of the articles used. This tool includes a list of 12 items

which must be scored by the reviewers along three categories; “Yes” (2 points), “Partial” (1 point), “No/Don’t Know” (0 points). The total score for the 12 items is added together, and depending on the score, the article will be of good (17-24 points), acceptable (9-16 points), or low quality (0-8 points). However, if an article received an acceptable or low score, it did not necessarily mean that the article will be removed from analysis, rather that the low quality was noted in the assessment. See Appendix C for a detailed breakdown of each paper's quality assessment.

2.2.5 Data Synthesis

Despite the fact this review included quantitative research only, heterogeneity of outcomes and paradigms used in the studies prevents the data from these studies being synthesised using meta-analysis. Therefore, a narrative synthesis was conducted on the data.

Table 2.1

PICOS Model of Eligibility Criteria

Study Elements	Description
Populations	Participants must be non-medical professionals; it is the aim of this study to investigate sexual decision-making in the general population, not in that of medical professionals, such as doctors, nurses, or healthcare workers. Participants must be between the ages of 18-30. Participants must be non-clinical.
Interventions	Studies will not be included/excluded based on information relating to intervention type.

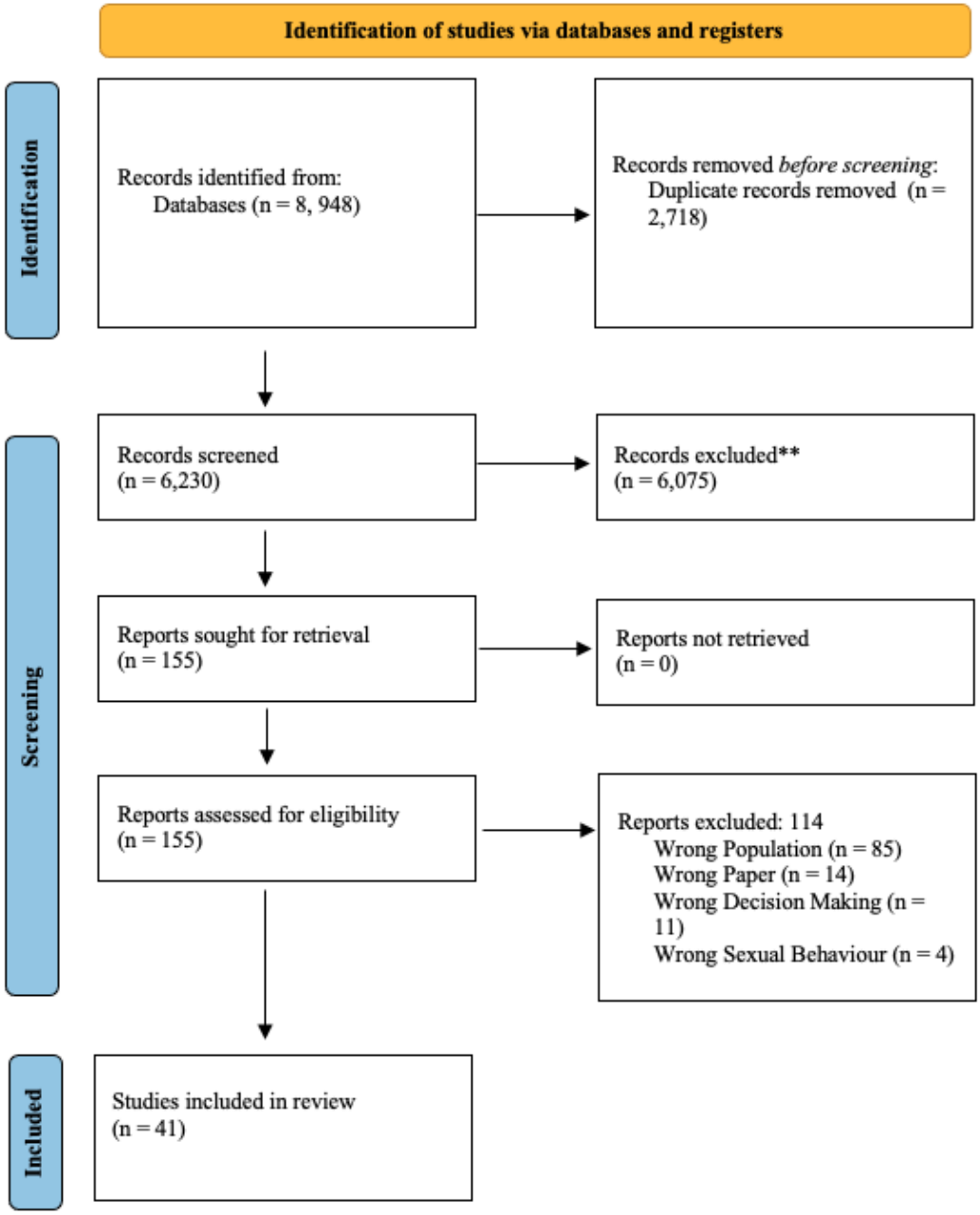
Comparators	Papers must be experimental in design, meaning there may be a control group.
Types of Outcome Measures	Decision-making must be measured as an outcome measure using an experimental design, such that some independent variable is manipulated.
Study Type	The studies to be used in this review must be quantitative or have a quantitative component.

2.3 Results

Following the database search, 8,947 articles were identified for possible inclusion in the review. During initial screening, 2,718 duplicates were removed. During abstract screening, 6,230 papers were excluded as they did not fit the inclusion criteria, leaving 148 studies for full text review. From these, 114 papers were excluded due to not fulfilling the inclusion criteria and 41 papers progressed to the next stages of the review, namely data extraction and quality assessment (see PRISMA flowchart for details including reasons for excluding papers).

Figure 2.1

PRISMA diagram of studies considered for the systematic review



2.3.1 Characteristics of Included Papers

A total of 7,229 participants were reviewed across the included papers. Regions of study included the USA (n = 20), the Netherlands (n = 2), the Republic of China (n = 1), Hong Kong (n = 1), Canada (n = 6), Belgium (n = 1), Spain (n = 1) and New Zealand (n =

1). Included papers were published from 2000-2024. Participants' ages ranged from 18-30. Mean age was not calculable due to reporting from individual papers. For a full breakdown of characteristics of included papers, see Table 2.2 below.

Table 2.2

Key Characteristics of Included Studies.

Author	Country	Study Design	Study Aims	N	Gender/Sexual Orientation	Measure of Decision-Making	Sexual Behaviour Measure	Quality Assessment Score
Berry et al., 2019	USA	Within participants	Determine whether probability discounting plays a role in decisions to engage in unprotected sex.	217	50% male, 50% female/ not reported	Sexual Probability Discounting Task	Sexual Probability Discounting Task, perception of STI risk questionnaire, the CDC Sexual behaviour Questionnaire	19
Cheng and Chiou, 2018	Republic of China	Between-participants	Demonstrate that sexual primes can induce greater discounting	122	49% women, 51% men/ 100% heterosexual	Temporal monetary discounting task	Sex Appeal Rating Task	19

(Study 1)			tendency in men, which then leads to a tendency towards cyber delinquency.					
Cheng and Chiou, 2018 (Study 2)	Republic of China	Between-participants	Demonstrate the relationship between sexual primes, rates of discounting, purchasing counterfeits online and invading someone's online privacy	72	100% male/ 100% heterosexual	Temporal monetary discounting task	Sex Appeal Rating Task	19

Collado et al., 2016	USA	Between-participants	Apply findings from previous research on deprivation and satiation to understand risky sexual decision-making	251	54% female, 46% male/ not reported	Vignettes	Vignettes, list desirable characteristics in sexual partner, questionnaire about sexual behaviour	17
Collado et al., 2017	USA	Within-participants	To investigate sexual behaviour in in the adolescent developmental period after high school, evaluate gender differences	262	54.8% female, 45.2% male/ not reported	Sexual Delay Discounting	Sexual Delay Discounting, CDC Sexual behaviour Questionnaire, Brief HIV Knowledge Questionnaire, STI Risk Perception	20

			in sexual delay discounting and examine the possible correlates of sexual delay discounting and self-reported risky sexual behaviours					
Czopp et al., 2004	USA	Within-participants	Examine the predictive value of a 'high cue' and ‘low cue’ sexual situation on explicit and implicit intentions	132	48.5% men, 51.5% women/ 100% heterosexual	Audio-Visual Vignette	Audio-Visual Vignette, Condom Implicit Association Task, explicit attitudes towards condoms, previous condom use	18

			towards condoms will predict intentions to use condoms					
Darioti s and Johnso n, 2015	USA	Within-particip ants	Assess sexual discounting among 18-24 year olds, including its relation to HIV knowledge, self-reported sexual and substance use risk behaviours and impulsivity	126	55.6% female, 44.4% male/ not reported	Sexual Discounting Task	Sexual Discounting Task, HIV Sexual Risk Taking behaviours, HIV Knowledge	20

Davis et al., 2010	USA	Between-participants	Examine the influence of alcohol expectancies on the cognitive mediation processes involved in underage (18-20) college women's risky sexual intentions.	94	100% women/ 100% heterosexual	Vignettes	Vignettes	21
Ebel-Lam et al., 2009	Canada	Between-participants	Manipulate sexual arousal and alcohol intoxication, in order to assess the	79	100% male/ 100% heterosexual	Video vignette	Video vignette	17

			causal impact of both on intentions to use condoms.					
Finkelstein and Brannick, 2000 (Study 1//Study 2)	USA	Between/ within-participants // within-participants	Assess if sexual partners' attitude towards condom use will influence participants' sexual decision making, regardless of participants' own feelings// Examine the impact of time pressure, own	96/ 95	55.1% females, 47.9% males/ 100% heterosexual// 41% male, 59% female/ 100% heterosexual	Vignettes	Vignettes // Vignettes and Condom Use Questionnaire	15

			attitudes, and partner					
Gagnon and Godin, 2000	Canada	Between-participants	Evaluate possible changes in predisposing factors to sexual preventive behaviours that could result from the availability of an efficient new antiretroviral therapy	136	59.56% women, 40.44% men/ not reported	Vignettes	Vignette and questions about sexual behaviour	16

Gebru et al., 2024	USA	Within-participants	Determine relationship between PrEP use and sexual delay discounting.	239	100% men/ MSM	Sexual Delay Discounting Task, MCQ	Sexual Delay Discounting Task, Sexual Risk Behaviours (Metzger et al., 1993), Perceived HIV Risk (Napper et al., 2012), Perceived STI Risk (Napper et al., 2012), HIV & STI testing history, Knowledge questionnaires (Carey et al., 2002; Jaworski et al., 2007)	21
Gebru & Wongsomboon 2024	USA	Within-participants	Examine the effects of sexual arousal and delay (and the combination of	115	65.2% female, 34.8% male/ 84.3% heterosexual, 12.2%	Sexual Arousal Delay Discounting	Sexual Arousal Delay Discounting, Condom Use Self Efficacy	20

			both) on condom use decisions		bisexual, 2.6% gay, 0.9% other orientations not on the list			
Granados et al., 2020	Spain	Within-participants	Uncover more about the Dual Control Model of sexual response and risky sexual behaviours	54	100% male/ 100% heterosexual	Vignettes	Vignette, Sexual history questionnaire, Sexual Excitation/ Sexual Inhibition Scales (Spanish version; Granados et al., 2017), Sexual Assertiveness Scale (Sierra et al., 2011), Ratings of Sexual Arousal & Ratings of Genital Sensations	17

							(Chivers, 2010), genital sexual arousal	
Harsin et al., 2021	USA	Between-participants	Examine sexual discounting and condom demand in tandem to exploring the relationship between discounting and operant demand	289	80% female, 20% male/ not reported	Condom Demand Assessment (Strickland et al., 2020), Sexual Delay Discounting Task	Condom Demand Assessment (Strickland et al., 2020), Sexual Delay Discounting Task, Sexual Desire Inventory (Spector et al., 1996), HIV Risk Taking Behaviour Scale (Ward et al., 1990)	20
Hennessy et al., 2007	USA	Within-participants	Evaluating the impact of negative and positive information on	655	49% male, 51% female/not reported	Partner Description Assessment Measures	Partner Description Assessment Measures	19

			participants when they are judging the attractiveness and risk of potential partners.					
Hoefnagels et al., 2006	The Netherlands	Between-participants	Increase understanding of the correlates of condom use for the prevention of STDs among heterosexual young adults	118	79.7% female, 20.3% male/ 97.3% heterosexual preference, 2.7% bisexual preference	Vignettes	Vignettes, Risk perception questionnaire	18

Jones et al., 2018	USA	Between-within-participants	Examine two forms of discounting (sexual and monetary) and their relationship to condomless anal sex.	458	100% male/ 100% men who report having sex with other men	MCQ and Sexual Delay Discounting	Sexual delay discounting, questions about sexual history, PrEP use	17
Lawyer and Mahoney, 2018	USA	Within-participants	Investigate if behavioural measures of delay discounting, risk taking, and or response inhibition are uniquely related to risky	296	41% male, 59% female/ 89.5% heterosexual, 10.5% unspecified	Monetary delay discounting, Monetary probability discounting	Sexual Risk Survey	18

			sexual behaviour in a community sample of young adults					
Lemley et al., 2017	USA	Within-participants	Examine relationships between monetary discounting, alcohol discounting, and sexual partners discounting.	42	100% female/ 100% heterosexual	Monetary delay discounting and Sexual Delay and Probability Discounting	Sexual Delay and Probability Discounting, Sexual Risk Survey, Sexual History Questionnaire	19
Lemley et al., 2018	USA	Within-participants	Examine how college women's sexual partner	42	100% women/ 100% heterosexual	Sexual Delay and Probability Discounting,	Sexual Delay and Probability discounting, Sexual Risk Survey	19

			choices differed across two condom availability conditions, and across partner desirability.			Monetary Discounting		
Lui and Hsu, 2018	Hong Kong	Within-participants	Examine the effect of sexual images on gambling decisions made under risk	34	100% male/ 100% heterosexual	Financial decision-making task	Sexual picture categorisation task	20
Macapagal et al., 2017	USA	Within-participants	Examine the effect of gain and loss-framed messages on decisions to	127	41.73% male, 58.27% female/ 100% heterosexual	Decision-making task	Sexual behaviour questionnaire	18

			have sex among single, heterosexual young adults.					
MacDonald & Fong, 2000 (study 1// study 4)	Canada	Between-participants// between-within participants	To test two conflicting hypotheses in order to understand how alcohol impacts condom use	65// 44	100% male/ unreported // 100% male/ unreported	Video Vignettes// Video Vignettes	Video Vignettes, Justifications to engage in unprotected sex// Video Vignettes, Justifications to engage in unprotected sex	17
MacDonald &	Canada	Between-n-	Evaluate the impact of self-	67	100% female/ not reported	Video Vignette	Video Vignette, Thought listing, Justifications and	18

Martineau, 2001		participants	esteem and mood on attention given to health risk cues and intentions towards protected sex				attitudes to engage in unprotected sex	
Mitzel et al., 2023	USA	Within-participants	Assess the relation of multiple indicators of condom use intentions to self-reports of past condom use behaviour, in order to clarify which	187	51.9% female, 47.6% male, 0.5% other/ 31.3% attracted to men, 32.2% attracted to women, 49% attracted to	Sexual Delay Discounting Task	Sexual Delay Discounting Task, Condom Use Behaviour from the Sexual Risk Survey, Indices of condom use intentions from the Sexual Delay Discounting Task	20

			indicator accounts for the most variance in condom use behaviour		men, 46% attracted to women, 5% attracted to men and women			
Negash et al., 2016 (Study 1// Study 2)	USA	Within-participants/ Between//within-n-	Examine the effect of sexual stimuli on delay discounting by assessing naturally occurring pornography	123/ 37	26% male, 74% female/ not reported // 64.86% male, 35.14% female/ not reported	Delay Discounting Task	Questionnaire on Pornography Consumption	19

		particip ants	consumption over time // Examined the effect of sexual stimuli on delay discounting by assessing altered porn consumption over time					
Reyna et al., 2011	USA	Within-particip ants	Examine risk taking both in a classic laboratory task, and in the context of real life risk taking, in order to test predictions	102	76% female, 24% male/ not reported	Framing task	Questionnaire based on gist and verbatim theory	17

			of fuzzy trace theory					
Reynolds et al., 2019	USA	Within-participants	Evaluate the relative contributions of executive function performance and impulsivity to risky behaviour	56	84% female, 16% male/ not reported	Iowa Gambling Task (IGT), Wisconsin Card Sorting Task (WCST)	Risky behaviour Questionnaire	20
Ross and Bowen, 2010	USA	Within/ between-participants	Examine the impact of partner familiarity and downward social comparison on college students'	180	55.56% female, 44.44% male/ 95.4% heterosexual, 4.6% bisexual	Vignettes	Vignettes, Sexual History Questionnaire	19

			ratings of the likelihood of sexual intercourse and condom use using dating vignettes					
Rupp et al. 2009	USA	Within-subjects	To understand women's neural responses to potential sexual partners to further understanding of women's sexual decision making to inform health	12	100% female/ 100% heterosexual	Sexual decision making task	Sexual decision making task	11

			related interventions					
Sen, 2004 (study 1// study 2	USA	Between-participants// between-participants	Manipulate HIV risk on a hypothetical friend, in order to investigate the impact of HIV likelihood of advice given to friend. Advice is then taken as a proxy for actual behaviour.	144//307	53.5% male, 46.5% female/ 100% heterosexual // 37.3% male, 62.7% female/ 100% heterosexual	Vignette// Vignette	Vignette, sexual behaviour measure// Benefits of Risky Sex, Costs of Risky Sex, Altruistic Cost of sex, Attitudes towards casual sex	15

Sheinfil & Woolf-King, 2022	USA	Between-participants	Investigate the causal effects of affective arousal and valence on condom use intentions and sexual abdication	136	50% women, 50% men/ 100% heterosexual	Vignettes	Vignettes, Sexual Sensation Seeking, Sexual Abdication (Masters et al., 2014)	20
Skakoon-Sparling & Cramer, 2015	Canada	Within-groups	Expand understanding of the impact and relevance of partner familiarity on risk perception in the context of sexual encounters	82	64.6% women, 35.6% men/ 3.7% bisexual, 96.3% heterosexual	Vignettes	Vignettes	18

			with new sexual partners					
Skakoon-Sparling and Cramer, 2021 (Study 2)	Canada	Within-participants	Aimed to focus on the element of relationship motivation in order to improve understanding of its association with condom negotiation	169	54% women, 46% men/ 2% bisexual, 98% heterosexual	Vignette	Vignette	23
Skakoon-Sparling &	Canada	Between-participants	Investigate the impact of sexual excitation and	166	62% women, 38% men/ 100% heterosexual	Vignettes	Sexual Excitation/Sexual Inhibition Inventory, Subjective sexual arousal,	20

Milhausen, 2021			inhibition on sexual risk taking				vignettes, Past sexual risk behaviour	
Sweeney et al., 2020	USA	Within-participants	Examine real-life self-reported sexual risk behaviour, sexual delay discounting, and monetary discounting in order to evaluate the domain-specificity of the relationship between	767	60% male, 40% female/ not reported	MCQ and Sexual Delay Discounting	Sexual Delay Discounting, Sexual History Questionnaire (Miller, 2008)	22

			discounting and sexual risk behaviour					
Tayler et al., 2009	New Zealand	Within-participants	Test whether discounting rates in intertemporal choices with relationship outcomes might differ for men and women depending on the type of relationship.	64	50% female, 50% male/ not reported	Monetary discounting, sexual discounting companionate discounting	Sexual discounting	18

Van Der Bergh and Dewitte (study 1// study 2// study 3; 2006)	Belgium	Between-participants	Investigate if participant behaviour in ultimatum games after exposure to sex cues will be associated with 2D:4D	44// 37// 95	100% male// 100% heterosexual	Ultimatum game	Sex cues	16
Walters et al., 2022	USA	Between/ within-	Aimed to replicate previous findings from the BART	79	52% female, 48% male/ 100%	Balloon Analogue Risk Task, Implicit	Implicit Sexual Risk Assessment, Risky Sexual Decision Making Scale	24

		participants	and validate a new measure of risk taking under sexual arousal.		predominantly heterosexual	Sexual Risk Assessment	(Skakoon-Sparling & Cramer, 2016), Sexual Risk Survey	
Wolfs et al., 2019	The Netherlands	Within-participants	Investigate the impact of implicit and explicit attitudes, and sexual arousal on intentions to use condoms	27	100% men/ 100% heterosexual	Explicit cognitions	Genital Sexual Arousal, Subjective arousal, Explicit cognitions, Implicit Association Task	22
Young & Jordan, 2013	USA	Between participants//	Test the impact of non-sexual and sexually suggestive Facebook images	49// 154	Male and female (didn't report	Own Likelihood of Condom Use// Own	Peer Likelihood Condom Use, Own Likelihood of Condom Use // Perception of	11

(study 1// study 2)	betwee n-particip ants	on intentions to engage in sexual risk	percentages)/ not reported	Sexual Risk Behaviours	Peer Sexual Risk Behaviours, Own Sexual Risk Behaviours

Note. All papers only reported either gender or sex, so whichever is reported by the authors is reported here.

It is important to note that each of the papers included in this review used different language for referring to sexual orientation of participants, for example, some papers referred to participants as heterosexual, homosexual, and bisexual, while some papers used terms such as men who have sex with men (MSM). When discussing the results of these papers, the chosen terms of the paper were used. Two papers used the Kinsey scale (Kinsey et al., 2003) to measure sexual orientation, which is a 7-item measure which asks questions about attraction and sexual behaviour in order to determine participants sexual orientation, which the scale categorises as one of six options, ranging from 0- Exclusively heterosexual, to 6-Exclusively homosexual.

There was significant heterogeneity in the methods used to quantify sexual behaviour across the studies in this review. Measures of sexual behaviour fell broadly into four categories: self-reported risky sexual behaviour (n = 8), sexual arousal (n = 4), sexual attitudes (n = 10), and sexual history and self-reported behaviour (n = 14). The most common measure of sexual behaviour was the Sexual Risk Survey (SRS; Turchik & Garske, 2011), used five times (Lemley et al., 2017; Lawyer and Mahoney, 2018; Lemley et al., 2018; Walters et al., 2022; Mitzel et al., 2023). A number of studies used single items or an unstandardised questionnaire to measure sexual behaviour (n = 10).

2.3.2 Quality Assessment

A detailed breakdown of quality assessment can be found in Appendix C. Scores ranged from 11-24. Only one paper (Walters et al., 2022) met all 12 criteria in the quality assessment tool. Included papers were of generally good quality, scoring an average of 18. The lowest scoring item was ‘sample size justified’ (Q7).

2.3.3 Paradigms Used to Measure Decision Making in Sexual Behaviour

2.3.3.1 Vignettes and Descriptive Tasks

Of the 41 articles included in this review, 22 made use of vignettes or vignette type tasks, across 26 studies. Vignettes typically involved asking the participant to imagine themselves in a hypothetical scenario, and then asking them to make decisions within the hypothetical scenario. Vignettes were presented mostly as written descriptions (n = 18), with a minority of papers presenting them as videos (n = 3; MacDonald & Martineau, 2001; MacDonald & Fong, 2000; Ebel-Lam et al., 2009) or audio with an accompanying image of a member of the opposite sex (n = 1; Czopp et al., 2004). Of the three papers that used videos as vignettes, none of them reported any significant impact of experimental manipulations on participant responding (Ebel-Lam et al., 2009; MacDonald & Martineau, 2001; MacDonald & Fong, 2000). A number of papers clearly laid out the development and validation of their vignettes, such as Skakoon-Sparling and Cramer (2015). Some papers acknowledged limitations of their studies, which included the lack of validity and psychometric testing of their vignettes (Ross & Bowen, 2010; Collado et al., 2016). Nineteen papers used Likert-type scales for participants to respond with. Three papers provided visual analogue-type scales for participants to respond with, which presented scales from 0-100 (Sheinfil & Woolf-King, 2022; Wolfs et al., 2019; Czopp et al., 2004). Three papers provided participants with a checklist of options (Harsin et al., 2021; Granados et al., 2020; Collado et al., 2016).

Three papers included in this section utilised experimental methods in order to measure sexual decision making but were included in this section due to the similarities of the experimental methods to vignettes. The studies included a factorial survey (Hennessy et al., 2007), a condom demand assessment task (Harsin et al., 2021), a sexual decision-making task which participants completed during fMRI acquisition (Rupp et al., 2009).

The results from this paper were analysed in this section, due to the tasks' similarities to vignettes, as the tasks were descriptive in nature.

Populations in these vignette-based studies were almost exclusively heterosexual college students (n = 21). A small number of studies focused exclusively on men (n = 3) or women (n = 5). A minority of studies (n = 4) included non-heterosexual participants (Skakoon-Sparling & Cramer, 2021; Hoefnagels et al., 2006; Ross & Bowen, 2010; Skakoon-Sparling & Cramer, 2015). In all of these studies there were a small number of bisexual participants (< 5%), who were essentially treated as heterosexual participants, that is, they were given vignettes about a hypothetical opposite-sex partner.

Almost all vignette-based studies included intentions to use a condom or protection as a measure of sexual risk (n = 24). One paper focused on 'contraceptive methods' (Granados et al., 2020), and asked participants if they would proceed with sexual behaviour, wait, or choose to not have sex. Another simply asked how likely it would be for participants to have sex with the pictured individual (Rupp et al., 2004). Papers that did refer to condom use varied in their measurement of intentions towards condomless sex. One paper (Collado et al., 2016) asked participants to select the number of behaviours they would be willing to engage in without a condom. Intentions to use a condom were often included as one item in a questionnaire which participants answered following exposure to the vignette. Other questions assessing sexual risk included intentions to engage in sexual behaviour, and likelihood of contracting an STI following unprotected sex. Due to their format, vignettes are easily modified to fit specific research questions. For a full breakdown of measures and research questions of individual studies, please refer to Table 2.

Of the six papers that used vignettes to measure the impact of sexual arousal on sexual decision making, all reported that sexual arousal did not impact sexual risk-taking intentions. Notably, Walters et al. (2022) reported that while men displayed riskier sexual

intentions than women, as men's sexual arousal increased, their risk intentions decreased. The authors noted issues with sexual priming elsewhere in the study, which may have also resulted in this unexpected finding. Seven of the 22 studies that included vignettes reported distinct gender differences between men and women. Men demonstrated greater risk-taking tendencies than women across a variety of domains (Walters et al., 2022), such as perception of risk, use of protection (Hennessy et al., 2007; Finkelstein & Brannick, 2000), and decision making in unfamiliar contexts (Skakoon-Sparling & Cramer, 2021).

Davis et al. (2010) investigated how the presence of alcohol in the vignette would impact cognition and risky sexual intentions amongst college aged women and reported that the presence of alcohol did not directly increase intentions to have unprotected sex; rather it affected cognitive appraisals of the situation and initial sexual intentions, which in turn increased women's intentions towards unprotected sex. Two studies manipulated participants through exposure to social media (Young & Jordan, 2001). It was reported that participants who viewed non-sexual Facebook images of their peers reported greater intentions towards condom use with a person of unknown HIV status. However, participants who viewed sexually suggestive images of their peers on Facebook indicated they were more likely to engage in unprotected sexual intercourse and estimated that a higher percentage of their peers did the same.

A number of papers reported that characteristics of the hypothetical sexual partners had a significant impact on participant responding. Across papers, it was typically reported that participants had a preference for lower risk partners (Rupp et al., 2004), and reported greater risks with more familiar partners. There were some exceptions to this, as noted in Ross and Bowen (2010), whereby participants reported no change in preference for familiar or unfamiliar partners. The relationship between attitudes, both of the participant and hypothetical sexual partner, affective states, and sexual risk behaviour was also investigated across a number of papers. Papers generally reported that attitudes and

affective states have a significant impact on condom use intentions (Wolfs et al., 2019), including attitudes towards condoms (Finkelstein & Brannick, 2000), low mood and self-esteem (MacDonald & Martineau, 2001). These findings indicate the complex relationship between sexual decision making, affect, and attitudes.

Three papers manipulated perception of risk via the availability of contraception (Hoefnagels et al., 2006; Granados et al., 2020; Harsin et al., 2021). The results from these papers were mixed. Hoefnagels and colleagues concluded that condoms are used by participants primarily for the prevention of pregnancy, rather than to prevent STIs. It was also reported in one of the papers, which manipulated the cost of condoms, that participants who would rather have unprotected sex than pay for condoms engaged in higher rates of risky sexual behaviour (Harsin et al., 2021). Two papers manipulated information relating to HIV and AIDS (Gagnon and Godin, 2000; Sen, 2004). Results indicated that when AIDS was presented to participants as a chronic condition, participants believed their sexual partners would not be supportive of condom use because the disease is not fatal. It was also reported that participants demonstrated higher levels of risky sexual intent where the risk of the participant and the hypothetical sexual partner contracting HIV was low (Sen, 2004).

2.3.3.2 Gambling and Gambling-Type Tasks

Of the 41 articles included in this review, six papers utilised a gambling type measure to quantify decision making across 8 studies. Measures used included the Balloon Analogue Risk Task (BART; n = 1; Walters et al., 2022), the Implicit Sexual Risk Association task (ISRA; n = 1; Walters et al., 2022), the Iowa Gambling Task (IGT; n = 1; Reynolds et al., 2019), the Wisconsin Card Sorting Task (WCST; n = 1; Reynolds et al., 2019), financial decision making tasks (n = 1; Lui & Hsu, 2018, Reyna et al., 2011), a sexual decision making task based on work by Prause et al. (2011) and Rupp et al. (2009) (n = 1; Macapagel et al., 2017), and an ultimatum game (n = 3; Van Der Bergh & Dewitte,

2006). Only two papers include measures that specifically measure sexual decision making (Walters et al., 2022, Macapagel et al., 2017); the remaining studies either manipulated exposure to sexual content prior to completing decision making measures (n = 5), or related scores of decision-making to self-reported sexual behaviour (n = 4).

Participants responded to these measures using a variety of methods; one measure utilised a Likert scale (Macapagel et al., 2017). The IGT requires participants to choose a card from one of 4 decks, following which they receive feedback on whether or not they received or lost money. The WCST operates similarly, in that participants sort piles of cards, and make changes by responding to feedback. The BART and ISRA both operate by participants engaging in a 'pumping' action, which either inflates a balloon (the bigger the balloon the more money they earn), or enlarges a sexually explicit image. Two studies had participants choose between an uncertain amount of money and a certain amount on financial tasks (Lui & Hsu, 2018; Reyna et al., 2011). As part of the ultimatum game, participants indicated through a series of financial choices the maximum amount of money they would offer to another player in the game, and the minimum amount of money they would accept from another player (Van Der Bergh et al., 2006). Populations were exclusively heterosexual, with four studies using a mixture of men and women. Two studies focused exclusively on male participants (Van Der Bergh & Dewitte, 2006; Lui & Hsu, 2018).

Four of the paradigms were correlated with self-reported scores of sexual risk, and it was reported that only one of these tests revealed any significant relationships. Poor performance on the WCST was associated with increased risky sexual behaviour (Reynolds et al., 2019). Performance on the BART was not significantly associated with a measure of sexual risk behaviour (Walters et al., 2022). Similarly, scores on the ISRA were not associated with the measure of self-reported sexual risk (Walters et al., 2022). Furthermore, neither the ISRA or BART were associated with responding on the vignettes

used by Walter and colleagues to measure sexual decision making. While the IGT was associated with increased risk behaviour in general, scores on the IGT were not specifically related to scores of sexual risk (Reynolds et al., 2019). Macapagel et al. (2017) did collect self-reported sexual behaviour data but did not report the correlation between self-reported sexual behaviour and performance on the sexual decision making task.

A number of papers investigated the impact of sexual arousal or sexual priming on participant sexual decision making (n = 5). The results across studies were mixed. The inconsistency of findings across studies may be due to gender; studies with exclusively male participants reported a significant impact of sexual arousal (Van Der Bergh & Dewitte, 2006). Walters et al. (2022) reported men in the sexually aroused condition earned more money on the BART than women, indicating greater risk taking. The remaining study (Lui & Hsu, 2018) reported no significant differences between participants in sexual and neutral trials, in a sample of heterosexual men. The impact of gender on sexual decision making was investigated in three papers, with results indicating that men engaged in riskier decision making on the sexual decision-making task (Macapagel et al., 2017), on the ISRA compared to the BART (Walters et al., 2022), and on a financial decision-making task (Reyna et al., 2011).

2.3.3.3 Discounting

Of the 41 articles included in this review, 17 studies utilised at least one form of discounting. Twelve studies measured discounting of sexual outcomes. One study measured companionate delay discounting (Tayler et al., 2009). Eleven studies measured discounting of monetary outcomes. Six studies measured monetary and sexual discounting. The majority of studies utilised college students as their participants (n = 12), and one paper used Mechanical Turk employees as their participants (Sweeney et al., 2018). A small number of papers focused on either men specifically (n = 3; Jones et al., 2018; Gebru et al., 2024; Cheng & Chiou, 2018), or females (n = 1; Lemley et al., 2018). Two papers

focused on men who have sex with men (MSM; Jones et al., 2018; Gebru et al., 2024). Some other studies also reported small numbers of sexual minorities, such as bisexual, gay and 'other', (n = 4; Gebru & Wongsomboon, 2024; Lawyer & Mahoney, 2018; Lemley et al., 2017; Mitzel et al., 2023).

2.3.3.3.1 Sexual Discounting. Twelve studies measured sexual discounting, using either delay (n = 11) and/or probability (n = 3). The format of sexual delay discounting tasks typically followed the procedure laid out by Johnson and Bruner (2012; n = 7), or Jarmolowicsz et al. (2015; n = 2). Both of these tasks included a pre-experimental portion, whereby participants selected a number of hypothetical sexual partners with whom they would like to have sex from a pool of images. These images are then used in the sexual discounting tasks. One paper measured sexual delay discounting using a questionnaire (Tayler et al., 2009). The tasks measuring probability discounting followed a similar structure to sexual delay discounting (n = 3; Berry et al., 2019, Lemley et al., 2017, Lemley et al., 2018), and included a pre-experimental portion whereby participants chose images of hypothetical sexual partners. One paper also measured sexual arousal delay discounting (Gebru & Wongsomboon, 2024).

Across five studies, there was greater discounting of condom protected sex with more desirable partners (Berry et al., 2019, Collado et al., 2017, Dariotis & Johnson, 2015, Gebru et al., 2024, Mitzel et al., 2023). Participants were also more likely to wait to use a condom or engage in sex with a less desirable partner where the risk of contracting an STI was higher (Berry et al., 2019; Dariotis & Johnson, 2015, Gebru et al., 2024, Lemley et al., 2018, Mitzel et al., 2023). Perceived severity of STIs also impacted likelihood of condom use, such that participants discounted condom use more for less severe STIs, such as herpes and chlamydia (Berry et al., 2019). Four studies investigating sexual discounting also reported some gender differences, such that women reported a higher likelihood of condom use across conditions of the hypothetical sexual partner (Berry et al., 2019,

Collado et al., 2017, Dariotis & Johnson, 2015, Sweeney et al., 2018). Only one study that investigated the impact of gender on condom use as measured by sexual discounting reported non-significant results (Tayler et al., 2009). This may be due to the way in which sexual delay discounting was measured; this was also the only study to measure sexual discounting using a questionnaire.

A number of papers reported significant relationships between discounting rates and self-reported sexual behaviours. For example, it was reported that responding on the SADD task was associated with condom self-efficacy (Gebru et al., 2024). Several papers reported that sexual discounting scores were related to risky sexual behaviours (Collado et al., 2017; Lemley et al., 2017; Sweeney et al., 2018), including increased number of lifetime risky sexual partners (Dariotis & Johnson, 2015; Lemley et al., 2018), and increased incidence of condomless vaginal and anal sex (Mitzel et al., 2023). Aspects of HIV experience were also associated with responding on sexual discounting tasks, such that those with greater HIV knowledge, and those who were PrEP experienced were especially sensitive to STI risk (Collado et al., 2017; Dariotis & Johnson, 2015; Gebru et al., 2024).

2.3.3.3.2 Monetary Discounting. All eleven studies measuring discounting of momentary outcomes used delay, and one measured both delay and probability discounting (Lawyer & Mahoney, 2018). A number of papers measured decision making using monetary discounting alone, and related discounting scores to scores from sexual behaviour measures (n = 6). All eleven studies measured monetary delay discounting, with one study additionally measuring probability discounting (Lawyer & Mahoney, 2018). The most common measure of monetary delay discounting was the Multiple Choice Questionnaire (MCQ; Kirby et al., 1999), which 3 studies used (Sweeney et al., 2018, Jones et al., 2018, Gebru et al., 2024). Most measures of monetary discounting took the

form of questionnaires (n = 6), with the remaining presenting as computerised tasks (n = 5).

Only three studies experimentally manipulated participants prior to completing the discounting task (Cheng & Chiou, 2018, Negash et al., 2016), the remaining eight related scores of discounting to other measures of sexual behaviour. Both studies which included experiential manipulation reported significant findings; it was reported that exposure to sexual primes increased discounting (indicating riskier decision making; Cheng & Chiou, 2018), and abstaining from pornography reduced rates of discounting (Negash et al., 2016). Some significant relationships between monetary discounting and self-reported sexual behaviour were reported. Two papers reported significant relationships between monetary delay and probability discounting and sexual risk behaviours (Lawyer & Mahoney, 2018; Lemley et al., 2017). However, three papers reported no significant relationships between monetary discounting and measures of sexual risk (Lemley et al., 2018; Sweeney et al., 2018; Jones et al., 2018). Two papers also reported no significant relationships between monetary and sexual discounting, indicating that the two types of tasks are measuring decision making in two distinct domains (Lemley et al., 2017; Lemley et al., 2018). Sweeney et al. (2018) specifically remarked that sexual discounting is a preferable index of risky sexual behaviour over monetary discounting.

2.3.4 Factors Associated with Sexual Decision-Making

2.3.4.1 Impulsivity/Risk Taking

Five studies investigated the impact of impulsivity/risk taking-related factors on sexual decision making. The most popular measure was the UPPS-P (n = 3; Reynolds et al., 2019; Dariotis and Johnson, 2015; Gebru et al., 2024). Of the papers that measured impulsivity using this measure, the only significant result was reported between results of sexual discounting and scores of the UPPS-P (Dariotis & Johnson, 2015). It was also reported that willingness to wait for condom protected sex was associated with less

favourable attitudes towards risk, as measured by the Attitudes Towards Risk scale (Dariotis & Johnson, 2015). Sensation seeking, as measured by the Brief Sensation Seeking Scale, was correlated with intentions to have sex (Reyna et al., 2011). Disinhibition was reported to predict performance on the ISRA and BART (Walters et al., 2022).

2.3.4.2 Psychological Factors

Five studies investigated psychological factors alongside sexual decision making. One psychological factor, response inhibition as measured by a stop-signal reaction task, was reported to have no significant association with sexual risk behaviours (Lawyer & Mahoney, 2018). However, the remaining three factors were reported to have significant relationships with sexual decision making. Relationship motivation was reported to be significantly related to sexual decision making, such that participants who were more sexually aroused and had higher rates of relationship motivation showed greater risk-taking intentions (Skakoon-Sparling & Cramer, 2021). Participants higher in relationship motivation were more concerned that condom use may threaten the success of a sexual encounter. Self-esteem was also measured (MacDonald & Martineau, 2001). It was reported that as self-esteem decreased, intentions to engage in risky sexual behaviour significantly increased. Altruism was also measured (Sen, 2004), and it was reported that amongst participants scoring high in egoism, risky sex intent was more sensitive to infection likelihood than that of altruists. Reynolds et al. (2019) measured social desirability, using the Marlowe Crowne Social Desirability Scale. Greater social desirability was associated with lower reported risky behaviour.

2.3.4.3 Socio-Behavioural Factors

Studies which measured behavioural factors measured largely substance use (n = 7), delinquency (n = 2), or behavioural activation (n = 1). Of the seven studies measuring substance use, one study did not report the measures used, or how substance use related to

scores of sexual decision-making (Jones et al., 2018). Measures of substance use (included use of alcohol, drugs, and tobacco) were heterogeneous, that is, no two studies used the same measure. Alcohol use was generally reported to be associated with sexual risk, such that increased consumption was related to riskier sexual behaviour (Lemley et al., 2017; Reynolds et al., 2019). One study reported an exception to this, potentially because alcohol use was measured with an unstandardised questionnaire (Berry et al., 2019). Non-smokers were more likely to report using an immediately available condom, and discounted delayed condom protected sex and delayed monetary rewards less than smokers (Sweeney et al., 2020). Drug use was also related to scores of sexual delay discounting (Dariotis & Johnson, 2015), as well as scores on the WCST (Reynolds et al., 2019).

A study investigating cyber delinquency and sexual arousal reported that sexually arousing images of women caused male participants to discount monetary outcomes more, which led to higher rates of cyber delinquency, indicating that rates of discounting are predictive of rates of cyber delinquency (Cheng & Chiou, 2018). Cyber delinquency refers to antisocial behaviour in digital spaces, such as cyberbullying, cyber fraud or theft, and illegal downloading (Cheng & Chiou, 2018). The same paper also reported that participants who had seen sexual primes were more likely to invade the privacy of others, however this effect diminished once discounting was controlled for. Behavioural inhibition (as measured using the Behavioural Inhibition Scale) was a significant predictor of sexual behaviour (Reyna et al., 2011). Behavioural activation (measured using the Behavioural Activation Scale) was correlated with intentions to have sex (Reyna et al., 2011). The behavioural activation system refers to a motivational system, which propels movement towards goals and is responsive to rewarding environmental stimuli (Reyna et al., 2011).

Two papers reported a social factor; Berry et al. (2019) measured the impact of membership in a sorority or fraternity on sexual decision-making. Its direct relationship to sexual decision-making was not reported. Reynolds et al. (2019) also measured social

desirability, using the Marlowe Crowne Social Desirability Scale, and identified participants who may have exhibited suboptimal effort during testing, using the Wechsler Adult Intelligence Span. Greater social desirability was associated with less reported risky behaviour.

2.3.4.4 Physiological Factors

Two studies reported measuring physiological factors Lui and Hsu (2018) measured skin conductance to indicate arousal during a financial decision-making task, following exposure to sexual or neutral primes. The results indicated that physiological responses to losses relative to gains predicted decisions in gambling in neutral but not sexual trials, which could indicate that sexual stimuli may oppose the attention enhancement effect of gambling losses. Another study measured participants' neural activity in an fMRI while they completed a sexual decision-making task in order to track brain activity while making sexual decisions (Rupp et al., 2009). Participants demonstrated different neural responses to male faces depicted as either high or low sexual risk, and engagement in high-risk sexual behaviour was associated with neural activation in specific regions of the brain.

2.4 Discussion

Evidence suggests that sexual decision-making is distinct from other types of health-related decision-making (O'Dell, 2008). This has led to the use of many paradigms and methods for measuring decision-making in sexual behaviour (Johnson et al., 2021), all of which may be measuring different constructs. The aim of this review and narrative synthesis was to evaluate the existing published literature in the area of decision-making in sexual behaviour, in order to identify the paradigms and measures that have been used to capture decision-making, sexual behaviour, and factors that impact upon the relationship between the two.

2.4.1 Domain-Specificity of Paradigms Measuring Sexual Decision Making

The results of the narrative synthesis confirmed previous findings that sexual discounting captures domain-specific sexual decision making (Johnson et al., 2021; Lawyer & Schoepflin, 2013). Monetary discounting on the other hand, is suited to measuring a more general type of decision making. Studies that included both types of discounting reported either a lack of a significant association between scores on monetary and sexual discounting, or a lack of association between rates of monetary discounting and scores of sexual risk. Jones et al. (2018) proposed two potential reasons for the lack of a significant relationship between monetary and sexual discounting; either the paradigms are measuring two distinct behavioural processes, or discounting in one context does not necessarily mean that discounting will occur in another context in the same way. It was concluded in a number of studies included in this review that sexual discounting is a more accurate measure for quantifying decision-making in sexual behaviour than monetary discounting.

There were a number of studies that only used monetary discounting to quantify decision-making in studies on sexual behaviour. Despite what was discussed above, these studies did report that sexual primes resulted in higher rates of discounting, and that rates of probability and delay discounting were associated with sexual outcomes. These conflicting findings may be due to the impact of priming on behaviour. Studies that reported no significant association between monetary and sexual discounting may indicate that sex is discounted in a particular way, that is different from how money is discounted. However, if sexual content is primed, this may activate a particular type of decision-making often seen in sexual discounting, whereby immediate reward is prioritised over long term gain. Therefore, other resources, such as money are discounted in similar ways to sex. Furthermore, as sexual content has already been primed, it may make sexual

content more easily accessible to participants, therefore their scores on sexual behaviour are increased. This is further supported by the results of Cheng and Chiou's paper, as participants who had been exposed to sexual content were more likely to engage in cyber delinquency, to purchase counterfeit items online and to invade someone's privacy, indicating such types of primes activate a specific type of decision-making. Therefore, the sexual primes make a specific type of decision-making more accessible, whereby all risk is treated similarly to sexual risk.

Previous research has made mention of a 'sexual myopia', whereby sexual cues redirect all cognitive resources in the brain to focus on achieving sexual outcomes (Ariely & Lowenstein, 2006). This could also help to explain why sexual primes result in altered responding in decision-making in non-sexual domains, as cognitive resources are being directed elsewhere (Ditto et al., 2006). This theory cannot be completely supported by the results discussed in this review however, as sexual primes were not studied in combination with monetary and sexual discounting.

There is also some evidence to suggest that the relationship between monetary discounting and sexual outcomes may be more nuanced than previously thought. For example, in Negash et al.'s (2016) study, it was reported that continued exposure to pornography was associated with higher rates of monetary discounting over a period of time, potentially indicating that increased pleasure seeking is associated with impulsive decision-making. Results also showed that abstinence from pornography was more strongly associated with lower rates of monetary discounting than abstinence from non-sexual outcomes. This may suggest that abstaining from sexual outcomes requires more self-control than abstinence from non-sexual outcomes, indicating that if someone is already abstaining from sexual outcomes, healthier decision-making in other domains becomes easier because a more protective type of decision-making has been activated.

Further supporting that sexual decision-making is distinct from other forms of decision-making, is the finding that the Iowa Gambling Task was not significantly associated with risky sexual behaviour specifically but was a significant predictor of generally risky behaviour. This again supports the idea that risky sexual behaviour involves awareness of a different type of risk, and while there may be overlap between the type of decision-making involved in risky sexual behaviour and the type of decision-making used in generally risky behaviours, sexual decision-making is ultimately distinct from other types of decision-making and requires the decision maker to consider different factors. However, it is important to note that only one paper in this review used the IGT and produced these results, so the results should be interpreted carefully, especially considering the IGT has been used frequently in literature in this area. Those papers were not included in this review as they did not meet the inclusion criteria.

Similarly, to the IGT, Walters et al. (2022) reported that performance on the BART, another general measure of decision making, was not associated with a measure of sexual risk behaviour. The ISRA task, which is analogous to the BART but uses sexual visual stimuli, was also uncorrelated with self-reported sexual risk behaviour. Walters and colleagues conclude that perhaps the BART and ISRA are suitable for measuring the impact of lab manipulations such as alcohol use but are not predictive of sexual behaviour. This provides further reinforcement for the domain specificity of sexual decision making, as the combination of exposure to sexual primes and more visual stimuli through the ISRA produced a greater number of pumps.

Contrastingly, a key finding of this review is that vignettes are a group of measures that are useful for investigating domain-specific sexual decision making. They are sensitive to a variety of sex-related variables, such as attitudes, affective states, gender differences (Walters et al., 2022), and perception of risk. However, papers which investigated the impact of sexual arousal on sexual decision-making using vignettes demonstrated no

significant results. Future research may wish to investigate why this is so. A noted benefit of vignettes arising from this review is their ease of use, and suitability for investigating a range of research questions within sexual decision-making domains. Vignette designs can be amended to facilitate investigation of complex aspects of sexual decision making, such as the intersection of condom price and time pressure, as was investigated by the Condom Demand Assessment Task (Harsin et al., 2021). The Condom Demand Assessment Task consists of participants reporting their subjective willingness to purchase a box of condoms, ranging from $1-$233, when presented with a time-sensitive hypothetical scenario in which they can have sex. At each price point, participants can choose to buy the box of condoms, have unprotected sex, or forgo sexual activity completely (Harsin et al., 2021). An important aside to the use of vignettes however, is the need for psychometric testing in order to ensure that vignettes which have been designed to investigate specific factors are valid and reliable. It was noted in a number of papers included in this review that the lack of clarity regarding psychometric testing presented a significant limitation (Collado et al., 2016; Ross & Bowen, 2010). Presentation of vignettes may also be important to their efficacy; papers which used vignettes presented as videos did not report any significant findings, potentially due to their format (Ebel-Lam et al., 2009; MacDonald & Martineau, 2001; MacDonald & Fong, 2000).

The results of this review indicate that in research specifically concerned with quantifying decision making in sexual behaviour, the most appropriate measures to quantify decision-making are vignettes, and either sexual delay or probability discounting. Further research is required to determine the suitability of the ISRA and sexual arousal delay discounting. Ultimately, which paradigm is most appropriate is dependent upon the aims of the research, and whether they are interested in investigating a more general or more domain specific type of decision making.

2.4.2 Gender Differences

A common finding across studies included in this review were the differences between how males and females make decisions in sexual behaviour. Terms such as male/female and man/woman, which typically refer to sex and gender respectively, were often used interchangeably in the papers included in this review. This blurs the lines between gender and sex differences, which is important to be aware of while interpreting these results.

Tayler et al. (2009) reported that there was no difference between rates of sexual discounting between male and female participants, contradicting the evolutionary idea that males have a preference for short term mating strategies. This finding is in contrast with the vast majority of the rest of the papers included in this review that investigated gender differences in sexual decision-making, which found differences in how men and women make decisions in sexual contexts. For example, one of the most common findings was with regard to gender differences in condom use; women tended to report condom use more than men, and men were less likely to engage in other condom related aspects of sexual behaviour, such as condom negotiation. This contradicts previous research, which has indicated that women tend to report lower condom use (Hall et al., 2019). It has been suggested that the fact that women outnumber men on college campuses, where most of the studies in this review were conducted, women (often in spite of their own desire to be in monogamous relationships) engage in non-monogamous relationships, settle for undesirable partners, and neglect condom use in order to compete against the threat posed by other women. This positions men as the sexual partner with more relative power in heterosexual relationships (Hall et al., 2019). While women may have higher intentions of using condoms, when it comes to actually using condoms, they may not feel empowered to do so. The Theory of Gender and Power helps to explain this dynamic (Wingood et al., 2000); it states that when women lack the resources to change a sexual situation, the

imbalance benefits partners who are men, which decreases the likelihood of using condoms, and increases the likelihood of engaging in risky sexual behaviours (Wingood & DiClemente, 2000). It has also been posited that because gender roles dictate that women should be responsible for contraception, this places more pressure on women to convince their partner to use a condom (Woolf & Maisto, 2008).

As noted prior, condom use is a common index of sexual safety across measures included in this review. It is important to note however, that rates of condom use are generally relatively low and have been in decline over the past number of years; research from the ESRI (Nolan & Smyth, 2025) and from the WHO (2024) indicate that approximately 40% of young men and women regularly neglect to use condoms. Therefore, any finding relating to condom use needs to be interpreted with an awareness that there may not be a direct relationship between intentions and behaviour in condom use. The nature of the relationship between intentions, knowledge and behaviour will be analysed in more detail in Chapter 5. It is also important to note that condom use was the most popular indicator of sexual safety in the literature reviewed in this chapter. While condoms are the most popular forms of protection against STIs and pregnancy, the use of other physical barriers, such as dental dams, are equally important to measure from a STI prevention standpoint (Takemoto, 2019). PrEP use, an important strategy for HIV prevention, was measured infrequently in the literature reviewed here (Gebru et al., 2024; Jones et al., 2018).

The results of our review indicate that men and women make decisions differently in sexual contexts, and value risk differently. Sexual priming reveals a gender difference in sexual decision-making; for example, when men are primed to feel sexually deprived, they're more willing to engage in risky sexual behaviours with desired partners, whereas priming sexual deprivation or satiation doesn't appear to impact women in the same way (Collado et al., 2016). More specifically, women are consistently willing to engage in

riskier sex with more desired partners, regardless of their primed sexual state. Another study found a similar result, that images of sexually attractive men don't impact rates of discounting in women, but images of sexually attractive women do impact rates of discounting in men (Cheng & Chiou, 2018).

Overall, these results suggest that sexual primes may impact men and women differently; for example, previous research has reported that men who had a higher arousal response to sexual stimuli were associated with higher intent to engage in coercive sex, compared to women (Crosby et al., 2021). Similarly, other research has reported that men are more motivated to approach sexual stimuli (Dewitte, 2016), and that males and females display different visual attentional patterns in response to sexual stimuli (Lykins et al., 2008).

Therefore, as sexual priming may not operate in a similar way in men and women, we cannot assume that they are priming similar affective states in experimental settings. It may be the case that sexual arousal operates more like a trait variable in women and is less malleable to contextual cues. Menstrual cycles and hormonal changes may offer some insight into the differences on sexual arousal between men and women. In a study of 26,000 diary entries, ovulatory increases in sexual desire and behaviour were reported (Arslan et al., 2021). In future studies that are collecting data about the sexual arousal of women or female participants, it may be more appropriate to opt for a longitudinal component, as this may more accurately capture sexual arousal as women experience it.

Skakoon-Sparling and Milhausen (2021) reported that in both men and women, a subscale of the Sexual Excitation and Sexual Inhibition Inventory measuring partner dynamics that inhibit sexual arousal, significantly predicted greater sexual risk-taking intentions. These results indicate that men and women who choose partners who do not value their own needs and desires are more likely to engage in risky sexual practices. Similarly, the same paper reported that low scores of Relationship Importance, a subscale

concerned with the importance of stability and security in a partner, were also significantly associated with risky sexual behaviour. This indicates that men and women who don't value being manipulated or used by a sexual partner are more likely to engage in sexual risks. These findings do highlight some commonalities between men and women with regard to sexual decision making. In both genders, participants who value sexual partners that are concerned with their welfare and needs, are more likely to make safer sexual choices.

2.4.3 Lack of Diversity

A key finding in this research is the lack of diversity in participants, specifically a lack of representation of sexual and gender minorities in the studies included in this review. For example, there was wide variety in how papers reported sexual orientation of participants; 12 papers did not explicitly state the sexual orientation of the sample, some papers opted to mention sexual behaviour instead of sexual orientation, that is, using terms such as MSM (men who have sex with men). While some papers reported bisexual participants, such participants were ultimately treated as heterosexual participants in some cases, as they were not given an option to view materials related to same-sex partners, such as in Skakoon-Sparling and Cramer (2015). Measurement of sexual orientation was also variable across papers. Some papers referred to sexual orientation as a preference (Hoefnagels et al., 2006); some opted to ask participants which genders they were attracted to rather than adhering to labels (Mitzel et al., 2023). Two papers utilised the Kinsey scale to quantify sexual orientation (Granados et al., 2020; Walters et al., 2022). This is a surprising choice as the scale has been criticised for being overly simplistic and focusing too heavily on behaviour (Galupo et al., 2014). Another paper used a similar measure, whereby participants were asked to indicate their attraction on a Likert type scale (Berry et al., 2019). Every other study included in this review relied upon self-report of sexual orientation. Gender was reported more consistently; however, sex and gender terms were

used interchangeably and little differentiation between terms was made. There was no reference to a third gender in any study. This gap in the literature, diversity of participants, will be addressed further in Chapters 3,4 and 5.

Compounding issues with sex/gender distinctions, some papers utilised outcome measures that are irrelevant with LGBT populations. For example, as has been stated previously, many measures focus on condom use exclusively as an indicator of sexual risk. This understanding of sexual risk does not necessarily extend to sexual risk in queer populations. Furthermore, it was stated above that sexual discounting is the most appropriate of the discounting paradigms for quantifying decision-making in sexual behaviour. However, the use of sexual discounting with non-heterosexual populations was limited amongst the studies included in this review; one paper used the measure amongst MSM (Jones et al., 2018), one paper used the measure with men and women who identified themselves as being attracted to either men, women, or both (Mitzel et al., 2023). Gebru and Wongsomboon's (2024) paper used their sexual arousal discounting measure with non-heterosexual participants. The way in which sexual discounting was used amongst the remaining studies (n= 9) may be incompatible for use with LGBT populations, as one of the mechanisms for measuring risk taking is how an individual values condom protected versus unprotected sex. As condom use is not a universal indicator of risky sex, sexual discounting as presented in the papers included in this review is not appropriate for use with populations who may use forms of protection other than condoms, such as women who have sex with women. Simply replacing condoms with other forms of protection may not work either; for example, the dental dam is often promoted in safer sex campaigns for use in vaginal oral sex, however women who have sex with women typically don't report using dental dams (Toman & Wesche, 2025), so replacing condoms with dental dams may not be an accurate way of tapping into sexual decision-making in this cohort. Women who have sex with women are encouraged to still use condoms in certain contexts, for example,

if sex toys are being shared between partners. However, the use of sexual discounting measures with non-heterosexual participants does demonstrate that these measures retain their validity when amended for use with these groups. Future research that uses sexual discounting to investigate sexual decision making amongst LGBT populations may choose to use more general language, such as ‘protection’ instead of ‘condom’, in order to allow for the fact that some populations may use forms of protection other than condoms.

2.5 Conclusion

This review provides significant findings that sexual decision-making, while being related to a general propensity for risk taking, is a process distinct from other types of decision-making that involve evaluating risk. Therefore, there is a need in research on sexual behaviour to use paradigms that have been specifically designed for the purpose of measuring sexual decision-making. Paradigms such as monetary discounting may not be appropriate in this type of research, as they may measure a general propensity for risk rather than the specific type of risk involved in sexual decision-making. In addition, we have highlighted reported gender differences in sexual decision-making, and have noted that priming of sexual content has different impacts on men and women. Further research on the nature of sexual primes is required to identify specifically why sexual primes don’t impact men and women in the same way, and if there are more effective ways to activate sexual decision-making in women.

Chapter 3.1 - Introduction

As outlined in Chapter 1, the overarching aim of this thesis is to merge a risk-based approach to sexual decision making with an approach that acknowledges the complex situational factors that influence decision making in sexual domains. In line with this, the following study sought to investigate the combined impact of situational, state-level variables with the impact of more stable, personality-trait variables, in order to uncover more about the process of sexual decision making.

3.1.1 Consequences of Sexual Risk

Recent years have seen a marked global increase in rates of STIs; in Ireland, for example, rates of STIs grew by 30.7% from 2022-2023 (HPSC, 2024). There has been some recent research to indicate this trend may be reversing; the Health Protection Surveillance Centre (HPSC) reports that rates of STIs have actually decreased by 8.5% in the first 44 weeks of 2025, compared to the same time period last year (HPSC, 2025). It was estimated that in 2018, 20% of the population of the United States of America (USA) had an STI at any one time with 15-24 year olds accounting for nearly half of all incident diagnoses (Kreisel et al., 2021). In Ireland, as of November 2025, 31 children under the age of 14 were diagnosed with an STI in 2025 (HPSC, 2025). 45% of all STIs notified in Ireland in 2023 were in individuals under 25 years of age (HPSC, 2024). Furthermore, a rapid communications article published by the European Centre for Disease Prevention and Control commented on the sharp increase in gonorrhoea diagnosed in women aged 20-24 across 15 EU/EEA countries, including Ireland (Nerlander et al., 2024). The report concluded with several suggestions, including to raise awareness among heterosexual populations of the rise of STIs, and underlining the importance of condom use and regular STI testing. According to the HPSC (2023) in the Republic of Ireland, rates of HIV increased by 68% in 2022, compared to pre-pandemic year 2019, with rates nearly doubling among women in that timeframe. The prevalence of HIV also remains extremely

high in the Global South, with 70% of persons with HIV globally living in sub-Saharan Africa (Parker et al., 2021), with rates due to rise as a result of the US pausing funding for foreign aid. For example, figures from Zambia revealed that due to aid disruptions, HIV acquisitions rose eight-fold (3.3 million acquisitions), and HIV related deaths increased by five-fold (1.6 million deaths; Mulenga et al., 2025). It is clear from the fluctuations in STI notifications over the past number of years that much remains unknown about what motivates protective behaviour in sexual domains.

3.1.2 Decision Making in Risky Sexual Behaviour

Like in other areas of health, individuals make sexual decisions based on a set of complex physical, cultural and social circumstances (Alexander et al., 2015). From the results of Chapter 2, it appears that sexual outcomes are considered and treated differently to other desirable outcomes, such as food or monetary reward. Previous research has explained the process of decision making using the dual processing theory, which describes decision making as being driven by two conflicting systems: an emotion-led, automatic system (System 1) and a logical, controlled system (System 2) (Salehinejad et al., 2021). Successful self-regulation requires cognitive strategies from System 2 to manage impulses from System 1 and delay immediate gratification. The somatic marker hypothesis takes this idea a step further, stipulating that decisions involving risk are influenced by both Systems 1 and 2. However, this theory also argues for the existence of a feedback loop between physiological arousal and emotional processing (Dunn et al., 2006). This interaction influences an individual's automatic perception of which choices are desirable and aversive. This process is biased in favour of System 2's appraisal of available options and can result in split-second decisions being made on the basis of a 'gut-feeling'. Recent research has reported that individuals vary in how effectively they utilize these somatic markers to guide their decision making.

Much remains unknown about the mechanism of decision making in sexual contexts; Rendina et al. (2018) reported that previous models which have sought to explain risky sexual behaviour have achieved some success but have been limited in terms of predictive power. Rendina and colleagues specifically call out the lack of models that incorporate a combination of state and trait variables to predict RSB; state variables, such as sexual arousal, fatigue and emotional affect, and trait variables, such as impulsivity, or self-efficacy. A model which includes a combination of both state and trait variables, in line with the somatic marker hypothesis, may stand to capture more of the variance in RSB, and thus more accurately ascertain which combinations are most impactful in RSB. This information can then be used to strengthen public health interventions, as well as sexual health education. Experimental paradigms like delay discounting are often used, as they have been proven relevant in providing an understanding of other forms of impulsive decision making (Johnson et al., 2021; Lemley et al., 2017; Wainwright, 2018).

In addition to the complexity of decision making in terms of navigating immediate gratification versus long term benefit, there are other factors that have been shown to impact upon the decision-making process in sexual contexts. These factors can include alcohol and substance use, sensation-seeking, impulsivity and fatigue (Scott-Sheldon et al., 2011; Donohew et al., 2000; Millar et al., 2019). However, as mentioned, Rendina et al. (2018) observed that previous models of sexual behaviour have focused on trait-like variables, such as sensation seeking, intentions and motivations of condom use, and self-efficacy; however, their power of predictability is limited. Similarly, situational state-like variables like sexual arousal, affect and tiredness have also been investigated, with again, limited power of predictability (Rendina et al., 2018). Thus far, little attempt has been made to develop a model which incorporates both types of variables, which may be used to predict sexual behaviour more accurately. A systematic review published in 2020

concluded that additional work needs to focus on underlying factors modulating discounting processes in sexual decision making (Johnson et al., 2021).

3.1.3 Developing a Novel Model of Factors Which Predict Risky Sexual Behaviour

3.1.3.1 Delay Discounting

Monetary delay discounting specifically refers to the types discounting of monetary rewards as the desirable outcome (Kirby et al., 1999). Higher rates of discounting indicate a higher level of risky decision making. Monetary discounting has been linked to risk behaviours within other domains of public health; for example, higher rates of discounting have been found in those with cocaine use disorder, behavioural addictions such as gambling disorder, problematic alcohol use, and tobacco smoking (Johnson et al., 2015; Wölfling et al., 2020; Bailey et al., 2018; Friedel et al., 2014). A common measure of monetary delay discounting is the Monetary Choice Questionnaire, a 27-item scale by Kirby et al. (1999), designed to estimate discounting rates using the parameter, k.

It has been found in previous research that discounting of monetary outcomes has been associated with various health risk behaviours. However, there is evidence to suggest, including in Chapter 2 of this thesis, that a more domain specific type of discounting may be necessary in order to capture the complexities of sexual decision making, such as sexual probability or delay discounting. However, compared to other domain-specific measures of discounting (such as sexual delay discounting), monetary delay discounting measures are typically easy to administer, and are less labour intensive for participants to complete. Furthermore, it has been reported that there is a surplus of sexual discounting measures, with little indication in the literature as to a standard measure (Johnson et al., 2021). As a result, it was an aim of this study to examine if delay discounting would be suitable for predicting sexual risk, if included in a model that accounted for other variables which may increase the predictive power of monetary discounting.

3.1.3.2 State and Trait Variables

The dual processing theory explored above, provides a framework for understanding factors which impact decision making, including that within sexual domains (Salehinejad et al., 2021): factors impacting the responsive, automatic System 1 include emotional affect, and sexual arousal. These factors are context dependent and can be referred to as state-like factors (Rendina et al., 2018). Factors which impact the cooler System 2 are more trait-like, between-person differences, such as impulsivity or negative affect (Rendina et al., 2018).

Another important observation made by Rendina et al. (2018) is that previous models of sexual behaviour have focused on individual, trait-like variables such as sensation seeking, intentions and motivations of condom use, and self-efficacy. An assumption of these models is that sexual behaviour as an outcome is relatively stable over time and deliberate. While the role of constructs such as intentions, impulsivity and self-efficacy are now well-understood in their role in sexual behaviour, their predictive power remains limited. However, it has also been noted that much of the variance in sexual decision making happens within individuals over a series of events, rather than between individuals, thus pointing to the potentially strong influence of context-dependent, situational factors. These factors can include sexual arousal and affect. Rendina et al. (2018) conclude that a framework that acknowledges both state and trait factors, as well as their interaction with each other, may be likely to offer the most complete image of risky sexual decision making.

Self-criticism is a trait variable linked to shame and internalised sexual stigma (Nappa et al., 2022). It has been defined as a negative self-to-self relationship, that individuals may activate within themselves as a response to failure or disappointment. Self-reassurance on the other hand, represents an opposing relationship with the self, whereby a person can activate an accepting and compassionate attitude towards the self, particularly when one encounters setbacks. Self-criticism can be an indicator of several

mental health problems, including depressive symptoms and social anxiety, and has been linked to maladaptive sexual behaviours, including compulsive sexual behaviour (Efrati & Gola, 2018). Related to self-criticism and self-reassurance are positive and negative affect. These constructs are also highly impactful on sexual behaviour; a review of the literature reported a link between emotional dysregulation and compulsive sexual behaviour (Lew-Starowicz et al., 2020). Weiss et al. (2019) also report a link between difficulty regulating positive emotions and sexual risk taking with uncommitted partners and impulsive sex behaviours.

Sexual arousal is a particularly salient variable in sexual contexts. It can cause 'sexual myopia', or a sense of tunnel vision, whereby all cognitive resources are diverted to attending to sexual gratification, thus increasing sexual risk taking and impulsivity (Ditto et al., 2006; Ariely & Lowenstein, 2006). Sexual arousal has been linked to safe sex behaviours in previous research including condom use, whereby participants that reported sexual arousal had decreased intentions to use a condom (Ariely & Lowenstein, 2006). Ariely and Lowenstein also noted that individuals typically underestimate how much sexual arousal impacts their own behaviour. Arousal has also been linked to increased intentions to engage in unprotected sex with a new sexual partner, and even general risk-taking unrelated to sex (Skakoon-Sparling et al., 2016). Measurement of sexual arousal can prove tricky, as it can fluctuate itself depending on the context and the individual (Rendina et al., 2018), and can fluctuate differently across genders (Chivers et al., 2010). In fact, it was noted in Chapter 2 that measuring sexual arousal longitudinally may allow for more accurate measurement in women, as women respond to sexual cues differently than men. Similarly, Skakoon-Sparling et al. (2016) reported that measuring sexual arousal can present challenges when participants are 'cold', as it can be difficult to recall their past experiences when removed from the heat of the moment.

Tiredness is also heavily implicated in risky decision making; for example, a review of studies reported that sleep loss and poorer sleep quality was strongly associated with risk-taking behaviour (Womack et al., 2013). Tiredness has also been linked with sexual risk taking, with Millar et al. (2019) reporting that indices of sleep quality were associated with condomless anal intercourse among men who have sex with men (MSM). In fact, Millar and colleagues conclude that addressing sleep health is vital in decreasing HIV risk in MSM.

3.1.4 The Current Study

The literature investigating risky sexual decision making demonstrates the clear need for a multi-factor model that may explain sexual decision making more comprehensively. This study aims to utilise delay discounting as the experiment paradigm to measure decision making. The relationship between delay discounting scores and other factors, such as fatigue, arousal and affect, will also be investigated in order to increase the predictive ability of delay discounting over RSB. Individual factors may be treated as moderating variables in the emerging model. This research will explore the impact of factors collectively, increasing the model's predictive power of RSB. Should delay discounting not accurately explain and predict decision making in RSB, the next study in this programme of research will seek to identify a paradigm that fits this gap.

The aims of this research were to identify factors that are particularly impactful on risky sexual decision making, in order to develop a novel model of risky sexual behaviour. The specific objectives of the study are as follows:

1. Develop and identify a novel model to explain and predict risk sexual behaviour, that includes a combination of state and trait factors.
2. Determine if these factors are common across sexual orientation and gender identity.

3. Determine if the predictive ability of delay discounting in risky sexual behaviour can be improved if looked at in combination with state and trait variables.

3.2 Methodology

3.2.1 Design

This study combines a cross-sectional design with an experimental component. The cross-sectional component consists of self-report questionnaire-based measures completed on the first day of data collection; the experimental part takes the form of a longitudinal component, whereby participants indicate their sexual arousal and risky sexual behaviour over the course of the following 29 days. The purpose of combining these two design types is to analyse the relationships between variables in order to understand which combination of factors best predicts and explains RSB. Furthermore, the relationship between sexual arousal and risky sexual behaviour over the course of 30 days is analysed.

3.2.2 Participants

Participants (n = 125) were recruited through a combination of online and in person strategies. The majority of students were female (72.8%), white (90.4%) and heterosexual (57.6%). The mean age of the sample was 23 (SD = 3.8; 18-42). Recruitment posters were shared around the DCU campus, and posts were shared on social media. The recruitment poster for this study can be found in Appendix D. Snowballing was an essential part of the recruitment strategy, as the nature of data collection lent itself to this strategy.

The age range of participants was 18-42 years (M = 23.16, SD = 3.79). The sample primarily consisted of women (72.8%) followed by men (20%), and a small percentage of gender minorities (7.2%). In terms of sexual orientation, participants identified mostly as heterosexual (57.6%), with the remainder of the sample falling under sexual minority (42.4%). The majority of the sample indicated that they were in a monogamous relationship (52%), followed by single, not dating (24%) and single, casually dating

(17.6%). The vast majority of the population were white (90.4%) and had attended third level education (52.8**%).** A full break-down of participant characteristics can be found in Table 3.1.

Table 3.1

Participant characteristics

Characteristic	***(n)***	***(%)***	***M***	***SD***
Age (years)			23.16	3.79
Gender				
Man	20	20		
Woman	73	62.8		
Transwoman	1	0.8		
Non-binary	3	3.2		
Gender-fluid	1	0.8		
Prefer not to say/Other	2	2.4		
Sexual Orientation				
Gay	5	4.5		
Heterosexual	58	53.4		
Queer	6	6		
Lesbian	10	9.4		
Bisexual	20	18.9		
Pansexual	5	4.5		
Asexual	1	0.8		
Prefer not to say/Other	2	1.5		

3.2.3 Materials and Settings

Data were collected through two platforms: participants completed the first battery of tests through Qualtrics, an online platform designed to collect data remotely. Participants then downloaded an app, AthenaCX (Holden, 2021), onto their phones. AthenaCX was a phone application designed to deliver ecological momentary assessment and surveys. This app sent participants a short survey at the same time each day asking them about their levels of sexual arousal and risky sexual behaviour for the prior 24-hour period. This app also sent them reminder notifications in case they forgot to complete that day's survey. Several measures were implemented in this study. They are detailed below.

3.2.3.1 Fatigue Assessment Scale

The Fatigue Assessment Scale (FAS; Michielsen et al., 2003) was used to measure fatigue. The FAS is a 10-item fatigue measure that has been found to have good internal consistency, reliability, and validity.

3.2.3.2 Emotional Affect

Emotional affect was measured using two scales: firstly, is the Anxiety Depression Distress Inventory-27 (ADDI-27; Osman et al., 2011). This measure has 27 items, with three subscales: General Distress, Positive Affect, Somatic Anxiety. Cronbach's alpha for each of these subscales is 0.91, 0.84, 0.84 respectively. Secondly, the Internal Positive and Negative Affect Schedule Short Form (I-PANAS-SF; Thompson, 2007) was used to measure affect, has 10 items, and has two subscales, Negative Affect and Positive Affect, with Cronbach's alpha 0.42 and .33 respectively.

3.2.3.3 Self-Criticism and Self-Reassurance

Self-criticism was measured using the Forms of Self-Criticising/Attacking and Self-Reassuring Scale-Short Form (Sommers-Spijkerman, 2018), a 22-item questionnaire. There are three subscales in this scale: Inadequate Self, Hated Self and Reassured Self.

3.2.3.4 Sexual Arousal

Sexual arousal was measured over the course of 30 days, using the methods of Rendina et al. (2018). This method ensures that both a context dependent state variable, and a trait sexual arousal variable can be calculated from the data. Participants completed a daily diary, detailing their sexual arousal and sexual behaviour. The diary contained 5 items, measuring sexual arousal and sexual behaviour over the previous 24 hours. This measure took approximately 5 minutes for participants to complete. The daily diary measured sexual arousal by taking the daily average of the first 3 items on the questionnaire and calculating an individual's average across days.

3.2.3.5 Risky Sexual Behaviour

Risky sexual behaviour was also measured over the course of 30 days. In the initial battery of measures completed by participants, an amended version of a subscale from the CARE questionnaire (Fromme et al., 1997) was used to measure risky sexual behaviour. This questionnaire consists of 5 questions asking about RSB over the past 6 months. Cronbach's alpha was 0.69.

As part of the daily diaries, participants were also asked over the course of 30 days if they had engaged in sexual activity in the last 24 hours, and if yes, was this activity with a casual or a romantic partner. The measure used in this study has been amended slightly from the Rendina et al. (2018) version, to focus on sexual behaviour with romantic and casual partners. Cronbach's alpha was 0.92.

3.2.3.6 Drug & Alcohol Use

Drug and alcohol use, as they pertain to sexual behaviour, were measured. Following the initial questions on the CARE questionnaire, a further 4 questions were shown to participants if they indicated that they had consumed drugs or alcohol before having sex in the last 6 months. Cronbach's alpha for this measure was .833.

3.2.3.7 Monetary Delay Discounting

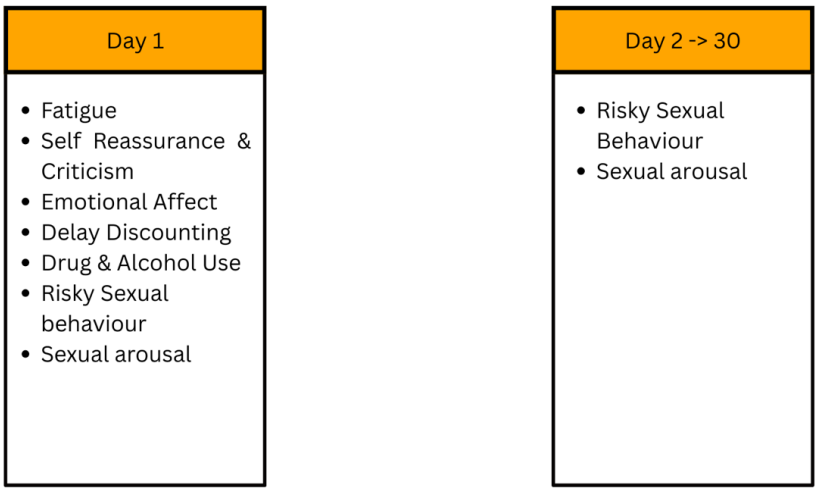
The Monetary Choice Questionnaire (Kirby et al., 1999) was used to measure delay discounting in this study. The Monetary Choice Questionnaire is composed of 27 fixed items that was designed to ascertain the rate of delay discounting of the participants, by asking them to choose between hypothetical smaller, immediate sums of money and larger, delayed sums of money. Participants were asked to answer the questions as if they were real life scenarios. Each of the 27 questions were presented one at a time. Both choices were presented on screen at the same time. After participants completed each item, they were immediately shown the next item.

3.2.4 Procedure

Once following the link (which they found on social media, scanned from a QR code, or was sent via email after getting in touch with the study email), participants were shown with the Plain Language Statement and a Consent form. See Figure 3.1 for an illustration of data collection across the 30 days. Both of these documents can be found in the Appendix E and F. Upon providing informed consent, participants were asked to provide demographic information such as their age, gender identity, sexual orientation, and romantic status. Participants then completed the battery of tests, which measured fatigue, self-reassurance and self-criticism, emotional affect, delay discounting, risky sexual behaviour and associated drug and alcohol use, and sexual arousal. Presentation of the measures was counterbalanced. Overall, it took participants approximately 20-30 minutes to answer this battery of measures.

Figure 3.1

Visualisation of which measures were collected over 30 days



Following this, participants were emailed instructions of how to download AthenaCX, the app used to input their daily surveys. This email can be found in Appendix G. For the next 29 days, participants were asked to complete the daily surveys, with participants who completed 85% of surveys (25 of the 29 days) being included in a draw for a voucher. As part of the daily diaries, sexual arousal was measured, as well as a shortened measure of risky sexual behaviour. This survey consisted of 5 items in total. It took participants approximately 5 minutes to complete the daily survey.

Following completion of the study, participants were provided with a Debriefing form, which reiterated to them the purpose of the study, and the contact details for the research team. It also reiterated to participants that they were free to withdraw from the study up until the day of the final daily diary. In the event that participants became distressed or upset, the contact details for DCU counselling services and Samaritans were included on the debriefing form. Details for the HSE Sexual Wellbeing website and LGBT Ireland, as well as contact details, were also included, in the event that participants required

additional support with regard to their sexual behaviour. The debriefing form can be found in Appendix X.

3.2.5 Ethical Considerations

Ethical approval was granted to this study by the Research Ethics Committee (REC) in DCU, and the letter of approval can be found in Appendix H. As this study was considered high risk by the REC, a progress report was required by REC in December 2022. Further approval was given by REC at this stage to indicate they were satisfied with the progress of the study. There were numerous ethical considerations involved in this study, due to the subject matter, the design, the collection of personal data, and the use of incentives. Each of these components will be explored below.

3.2.5.1 Subject Matter of Study

Participants may have found the sexual component of the study uncomfortable, as the study was concerned with measuring risky sexual behaviour and sexual arousal. Some of the other measures may also have been considered sensitive, as they pertained to emotional affect, drug use, and self-criticism. As a result of this, it was made abundantly clear to participants, through the Plain Language Statement, the Consent form, and the Debriefing form, that their participation was entirely voluntary, and that if they wished to withdraw their consent to partake in the study, they could do so and withdraw their data at any time. Participants could withdraw their data in a number of ways: they could directly delete their data that had been collected on the AthenaCX app by going into the settings on the app. Otherwise, participants could get directly in touch with the researcher via the study email and withdraw their participation. Participants also had the option to ‘Unenroll’ from notifications, whereby they could stop the app from sending them notifications to complete the daily diary, but the data that had been given would not be withdrawn, thus allowing their data to remain in the study. Participants were made aware of this

information and were informed how to delete their data and how to unenroll from the study.

3.2.5.2 Study Design

Due to the longitudinal component of the study, and the fact that AthenaCX, an additional app was used to collect this longitudinal data, also presented as an ethical concern. However, no identifiable data was collected from participants on this platform, for example, email addresses, phone numbers, names or IP addresses were not collected on AthenaCX. While participants did need a phone with a registered account on either the App Store (for iPhone users) or Google Play (for Android users), AthenaCX did not collect any personal information from this. The use of AthenaCX also meant the researcher did not have to get in touch with participants via email every day, therefore reducing contact between the researcher and the participant.

3.2.5.3 Data Management

Email addresses were collected from participants in order to send the instruction email to participants after they had finished the initial battery of tests. As this is personal, identifiable information, care was taken to ensure this information was not stored with the other data collected as part of this study. Participant email addresses were stored in an encrypted password protected file, alongside participant numbers that were used to allow participants to log into the study on AthenaCX. This participant number was used to track participants' entries across the 29 days of the daily diaries. Participant numbers were randomised and took the format of 'participant_number'. This participant number was required for participants to log into their AthenaCX account and was communicated to participants in the instruction email.

3.2.5.4 Incentives

Due to the fact that this study had a longitudinal component, incentives were used to try to reduce the amount of attrition, both in the transfer between the initial battery to AthenaCX, and attrition during the daily diaries themselves. Therefore, participants were informed that if they completed 25 of the 29 daily diaries, they would be included in a raffle for a €50 voucher. This component was added to the project in keeping with the REC's specific guidelines on the use of compensation and incentives.

3.2.6 Data Analysis

Preliminary analysis, consisting of tests of normality, linearity, multicollinearity, and homoscedasticity were conducted on SPSS. Data cleaning and coding was conducted on Qualtrics, Microsoft Excel and SPSS. Descriptive statistics were conducted on SPSS.

3.2.6.1 Regression Analyses

Three hierarchical regressions were conducted on the data, in line with the research questions for this study. This analysis was conducted on SPSS.

3.2.6.2 Longitudinal Data

Analysis was conducted on the longitudinal data in this study. Exploratory analysis for the variables was planned in the daily diaries, in order to explore the relationships between sexual behaviour and sexual arousal over 30 days. The analysis for this data was conducted on RStudio.

3.2.6.3 Dummy Coding Sexual Minority Status

There were a number of planned analyses to explore the impact of sexual orientation and gender identity on the relationship between the predictor variables and risky sexual behaviour. These analyses were not possible due to small numbers identifying as specific sexual and gender minorities, resulting in a lack of power. Therefore, a new variable was computed, whereby participants were dummy coded as being either

heterosexual, cisgender participants (HCPs) or participants who identified as either a sexual or gender minority, or both (SMPs). This made further analyses possible, as there were more even numbers in each group.

3.3 Results

Data from 125 participants were analysed as part of this study. Data from the I-PANAS were excluded as a result of a low Cronbach's alpha. See Table 3.2 below for the means, standard deviations, range values and Cronbach's alpha for each variable collected in this study.

3.3.1 Data Cleaning of Delay Discounting Data

Initially, k scores were used as a score of delay discounting. These were calculated using an Excel-based automatic scorer by Kaplan et al. (2016). The scorer uses the hyperbolic discounting equation from Mazur and Vaughan (1987), $V = A/(1 + kD)$. V represents the smaller, immediate amount, A represents the larger delay amount and D is the delay associated with A. Where participants chose the smaller, immediate option, a value of 0 was given in the scorer, and a value of 1 was given to the larger, delayed choices. Using this equation, a k value is calculated for each of the 27 items in the questionnaire. Consistency scores are also calculated for each participant's response, in order to ensure participants are attending to the questionnaire. This is calculated by counting the instances of 0s prior to the given k value for that response, and instances of 1s at and following the k value for that item. This number is then divided by the number of items possible (in this case 27), with larger numbers indicating a more consistent response pattern. Kaplan and colleagues recommend that researchers examine responses of participants with consistency scores lower than 75%, as they may indicate a lack of

attention by participants while completing the questionnaire. This was not an issue in the current research, as all consistency scores were above 75%.

Once the consistency scores are calculated, overall k scores for each participant can then be calculated. The k value(s) with the highest consistency scores for each participant are identified. In cases where the highest consistency score occurs only once, the geometric mean between this value and the k value immediately preceding it is calculated. Where the highest consistency value had occurred more than once, the geometric mean of all the associated k values was calculated in order to find the participant's overall k score. All of these calculations are done within the automatic scorer. This scorer has been reported to be a reliable means of calculating k scores (Kaplan et al., 2016).

Despite the validity of the described calculations, the k scores in this study were not normally distributed, were non-linear, heteroscedastic, and there were a number of outliers. This can be typical of k values; Kaplan et al. (2016) have reported that the distribution of raw k values tends to be skewed, as have other authors (Landes et al., 2010). Kaplan and colleagues (2016) recommend logarithmic transformations, as well as square-root transformations in some cases of severe skew or kurtosis. As such, a number of transformations were conducted on the data, none of which improved the data. Scores of delay discounting were instead represented by percentage sooner smaller calculations, meaning participants' scores were converted into the percentage of responses that they chose the smaller sooner choice, over the larger, delayed response. The smaller the score that participants received, the higher the rate of delay discounting. Percentage sooner smaller demonstrated improved normality and linearity; there were still a number of outliers, but the data were relatively normally distributed and linear.

Table 3.2

Means, standard deviations, range values and Cronbach's alpha for each variable.

	Delay Discounting	**General Distress**	**Somatic Anxiety**	**Positive Affect**	**Hated Self**	**Reassured Self**	**Inadequate Self**	**Fatigue**	**Sexual Arousal**	**Positive Affect**	**Negative Affect**	**CARE**	**Drug Use**
Mean	.51	24.06	16.63	23.45	9.95	24.06	27.82	27.64	6.86	14.73	11.12	10.26	7.68
Standard deviation	.21	8.09	6.01	6.96	4.93	6.54	6.33	8.1	2.96	3.68	3.11	4.4	4.3
Range	0-1	9-43	9-37	10-44	5-24	10-40	14-40	14-48	3-12	7-23	6-21	5-25	0-18

Cronbach's Alpha	.92	.91	.84	.84	.89	.89	.75	.9	.92	.33	.42	.69	.83

3.3.2 Preliminary Analysis

3.3.2.1 Longitudinal Data

Exploratory analysis between variables measured in the daily diaries was planned. However, due to high rates of attrition in this component of the study, data analysis was limited. Of the 125 participants who took part in the initial battery of assessments, 47.2% (n = 59) continued to the next stage of the study. Of those participants, 23.7% completed 85% of the daily diaries. Over 35% of participants who continued to the next stage of the study did not respond to any of the daily diaries (35.6%).

Analysis that was conducted evaluating the relationship between sexual arousal and risky sexual behaviour over the course of the 30 daily diaries, did reveal a significant correlation ($p < .001$). This result indicates that the initial measure of sexual arousal is suitable to include as a predictor in the model developed in later analysis, as the strength of its temporal relationship to RSB has already been demonstrated.

See Table 3.3 for a breakdown of the means, standard deviations and bivariate correlations between each of the variables to be included in the regression analysis.

Table 3.3

Means, standard deviations, and bivariate relationships between all variables.

Variable	Mean	SD	1	2	3	4	5	6	7	8
1.Delay discounting	.51	.21	-							
2. Hated Self	9.95	4.93	.225*	-						
3. Reassured Self	24.06	6.54	-.146	-.640**	-					

4. Sexual Arousal	6.86	2.96	-.026	.026	-.066	-				
5. Fatigue	27.64	8.1	.276**	.536**	-.526**	.069	-			
6. General Distress	24.06	8.09	.113	.682**	-.616**	.151	.563**	-		
7. Somatic Anxiety	16.63	6.01	.114	.459**	-.305**	.114	.532**	.534**	-	
8. CARE	10.26	4.4	-.007	.158	-.064	.193*	.186*	.014	.095	-

** Correlation is significant at the 0.05 level (2-tailed)*

*** Correlation is significant at the 0.01 level (2- tailed)*

3.3.2.2 Linear Regression of Sexual Arousal and Risky Sexual Behaviour (Day 1 Data)

A simple linear regression was calculated to predict risky sexual behaviour from sexual arousal. A significant regression equation was found [$F(1, 124) = 4.766$, $p < .05$], with an R^2 of .037.

3.3.2.3 State Predictors of Risky Sexual Behaviour

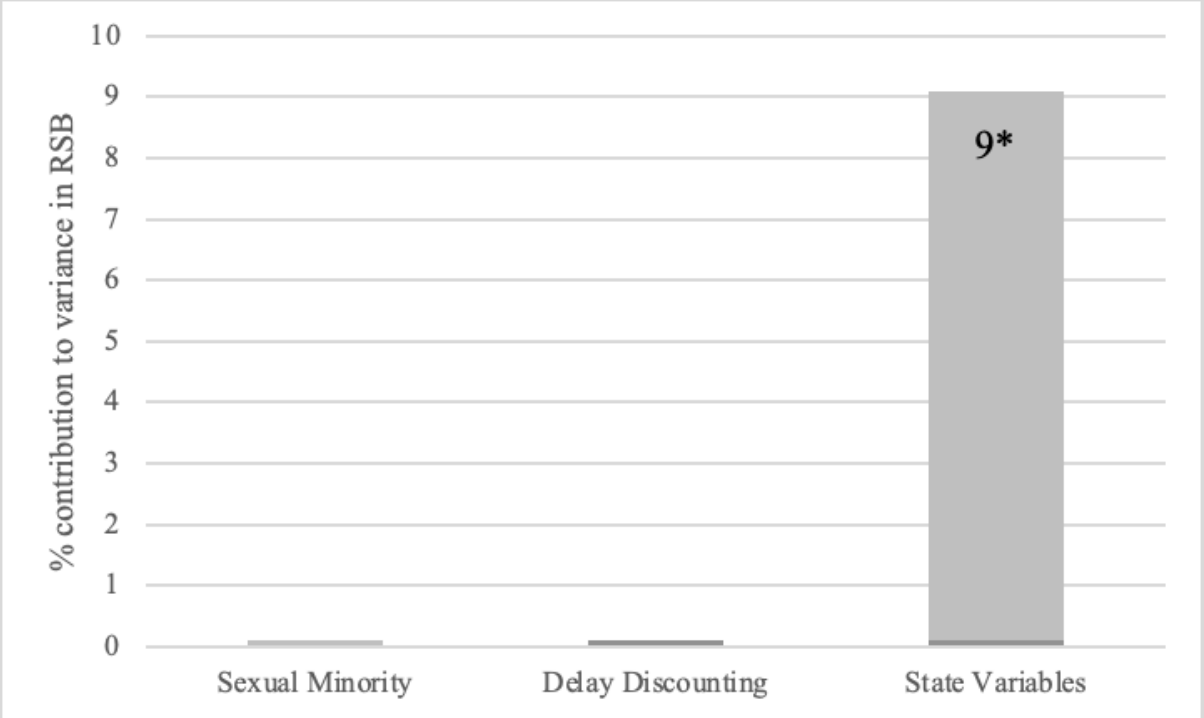
At this stage, two hierarchical regressions were conducted, in order to investigate the individual impact of state and trait variables on RSB, while accounting for sexual minority status. The hierarchical regression conducted to assess the predictive power of state variables. Assumptions of hierarchical regression were met. Sexual/gender minority status was entered in Step 1 and explained only .1% of variance. This block was not significant. At Step 2, delay discounting was entered. Delay discounting was included as a block in this regression, as there is evidence to suggest that impulsivity is heavily influenced by context, thus qualifying as a state variable. This block was not significant and did not contribute any variance to the model. At Step 3, state variables were entered,

namely Sexual Arousal, Fatigue, General Distress and Somatic Anxiety. This block was significant, with an R^2 of 9.0%, [$F(4, 115) = 2.85$, $p < .05$]. However, the model was still non-significant, despite accounting for 9.1% of the total variance, [$F(6, 115) = 1.913$, $p = .085$].

In the final model, two of the predictors were deemed statistically significant; 1) Sexual Arousal, which achieved a beta value of .196, ($t = 2.175$, $p < .05$) and 2) Fatigue, which achieved a beta value of .285 ($t = 2.346$, $p < .05$).

Figure 3.2

Relative contribution of each step in the state hierarchical regression to the variance in RSB



*Note. * indicates significant association*

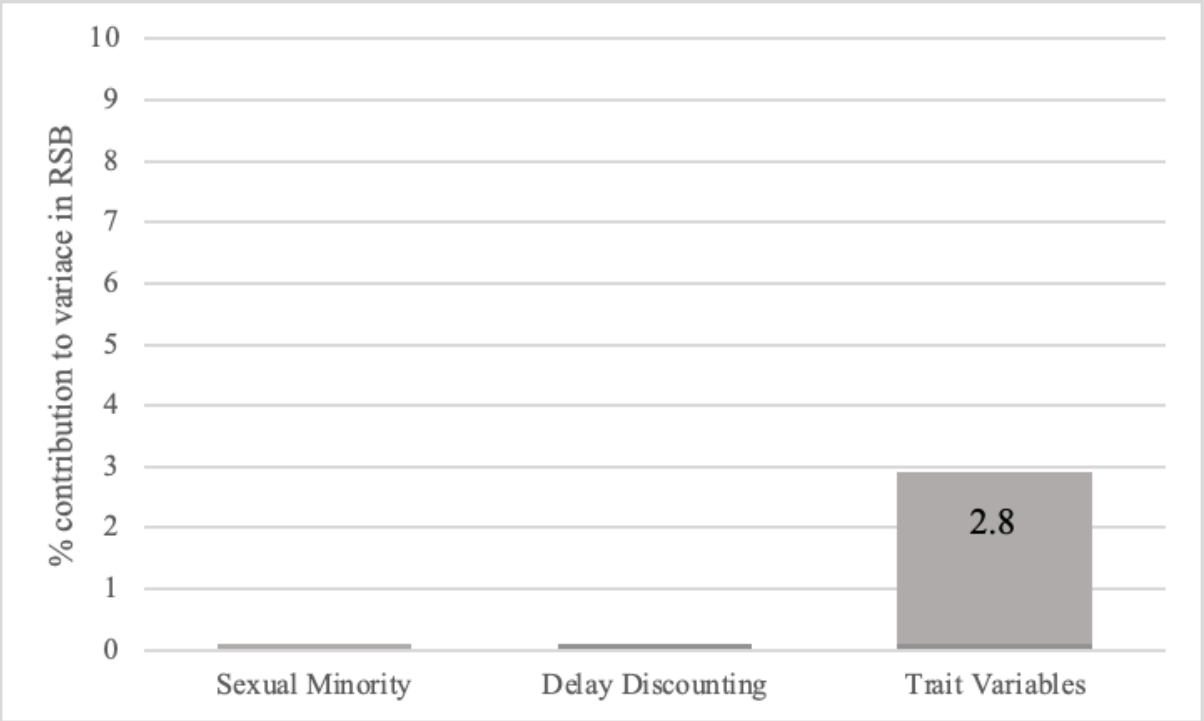
3.3.2.4 Trait Predictors of Risky Sexual Behaviour

A hierarchical regression was then conducted to explore the predictive power of trait variables on RSB. All assumptions for hierarchical regressions were met. Same as the state variable hierarchical regression, at Step 1, sexual minority status was entered, and at Step 2, delay discounting was entered, with the same results as before (See Fig 3.2). At

Step 3, the remaining trait variables, Hated Self and Reassured Self, which was also non-significant. The model accounted for 2.9% of the variance, but was not significant [F(4,115) = .865, p = .487]. In the final model, none of the predictors were significant.

Figure 3.3

Relative contribution of each step in the trait hierarchical regression to the variance in RSB



3.3.2.5 State and Trait Predictors of Risky Sexual Behaviour

A hierarchical multiple regression was used to assess the impact of state and trait variables on risky sexual behaviour. Preliminary analysis confirmed that the data did not violate the assumptions of normality, linearity, homoscedasticity, and independence of residuals. A number of variables were multicollinear and were removed from the analyses; namely Inadequate Self (from the Self-Criticism and Self-Reassurance Scale), and Positive Affect (subscale of the Anxiety Depression Distress Inventory). Sexual minority status was not included in this model, due to its insignificance as a predictor in the individual state and trait models.

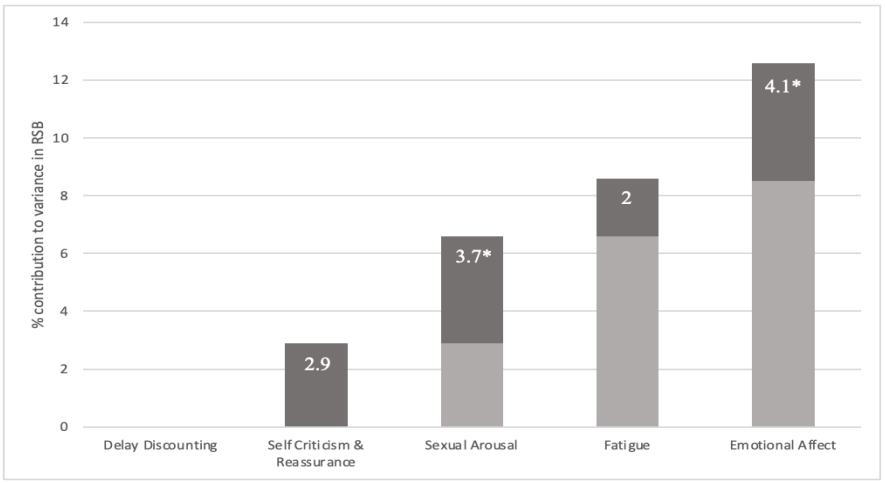
Scores of delay discounting were entered at Step 1 (See Fig 3.3), due to previous literature indicating the strong relationship between impulsive decision making and sexual risk behaviour. This block did not significantly contribute to the model and did not explain any of the variance in risky sexual behaviour. The second set of predictor variables consisted of Hated Self and Reassured Self, both subscales of the Self Criticism and Self Reassurance Scale. This model at this point was not significant, but the block accounted for 2.9% of the variance.

At Step 3, Sexual Arousal was entered as the only predictor in this block. This block accounted for 3.7% of the total variance; R^2 change = .037, F change (1, 114) = 4.47, $p < .05$. At this stage, the model accounted for 6.6% of the variance, but was not at a significant level. At Step 4, fatigue was entered. This block explained 2% of the variance, but again, was not at a significant level. At Step 5, General Distress and Somatic Anxiety were entered, both of which are subscales of the Anxiety Depression Distress Inventory. The block accounted for 4.1% of the variance, however was not significant. However, at this point, the model accounted for 12.6%, and was significant [$F(7, 111) = 2.29$, $p < .05$].

In the final model, four of the predictors were deemed statistically significant; 1) Hated Self, which achieved a beta value of .291 (t = 2.132, $p < .05$), 2) Sexual Arousal, which achieved a beta value of .217 (t = 2.397, $p < .05$) , 3) General Distress, which achieved a beta value of -.036 (t = -2.185, $p < .05$, and 4) Fatigue, with a beta value of .247 (t = 2.009, $p < .05$).

Figure 3.4

Relative contribution of each step in the hierarchical regression to the variance in RSB.



Note. * indicate significant association

3.4 Discussion

Previous research that has sought to develop models to describe RSB, have had limited predictive power (Rendina, 2018), potentially due to these models not including a combination of trait and state predictor variables. The aim of this research was to develop a novel model which built upon previous research, by increasing predictive power and including a combination of state and trait variables. An additional novelty within this research was ensuring the developed model extended to sexual minorities.

3.4.1 Predictive Factors of Risky Sexual Behaviour

3.4.1.1 Self-Criticism and Self Reassurance

Hated Self, a subscale from the Forms of Self-Criticising and Self-Reassuring Scale (Sommers et al., 2018), was the only trait predictor that significantly contributed to the overall combined model of RSB. Given that the remaining significant predictors were all state variables, the significance of self-hate in this model speaks to its relevance to risky sexual behaviour. This has been supported by other research, linking higher rates of self-hate to maladaptive sexual behaviour (Castilho et al., 2017), including compulsive sexual behaviour (Efrati & Gola, 2018). It is important to note the difference between self-hate and self-criticism; self-criticism comprises a critical attitude towards the self, but one that is ultimately geared towards self-improvement, whereas self-hate is oriented towards punishment and rejection of the self in response to perceived failures or shortcomings (Nappa et al., 2022).

Hated Self was not a significant contributor to the trait specific model, where sexual minority status had been entered in the first block. This indicates that when sexual minority status is accounted for, Hated Self is no longer a significant predictor of RSB. This is supported by the literature; Nappa et al. (2022) reported that sexual orientation

moderated the relationship between self-hate and risky sexual behaviour, such that self-hate predicted RSB in sexual minority men specifically. Nappa and colleagues remarked that this may indicate that among sexual minority men, RSB represents a means of punishing and harming the self. Other research has reported that among psychiatric patients, self-hating forms of self-criticism were the strongest mediators between shame and depression, anxiety, and stress (Castilho et al., 2017). This study also highlights the strong link between self-hate and shame, particularly external shame, where attention is focused on others holding a negative view of the self.

As demonstrated by the results of Nappa et al. (2022), sexual minorities experience significantly higher rates of self-hate, potentially due to the difficulty of accepting their identity and sexual selves (Castilho et al., 2017). It has been noted by other researchers that shame and secrecy continue to be salient themes in the study of queer experiences (Ovesen, 2023), due to the pressures of growing up in a heteronormative society. This link between self-hate and shame can represent a significant barrier amongst queer people towards accessing healthcare and the development of adaptive coping mechanisms (Eckhert, 2016). This is reflected by the unique risks that sexual minorities face in the transmission of STIs, which can often occur due to a lack of education and awareness. This information is of relevance to public health professionals, as an awareness of the potency of self-hate and shame as drivers in health decision making can improve the efficacy of public health campaigns. Eckhert (2016) noted that while efforts have been made to demedicalise the identities and behaviour of queer people, medical professionals should continue to ask themselves how they can better provide support for queer patients, rather than asking how and why queer patients are different.

It is also important to note that that Reassured Self, the other included subscale from the Forms of Self-Criticising and Self-Reassuring Scale (Sommers et al., 2018), did not significantly contribute to the overall model, or the individual trait model. This has

been supported by the findings from Nappa et al. (2022), who note that while sexual minority participants report higher levels of self-criticism and self-hate, this does not necessarily reveal a reduced capacity to provide self-reassurance.

3.4.1.2 Sexual Arousal

Previous literature has identified sexual arousal as an important determinant in situations where individuals are making decisions to be sexually safe or not (Skakoon-Sparling et al., 2016; Skakoon-Sparling and Cramer, 2021). This finding has been supported by the results of this study. Sexual arousal emerged in both the state only and overall models as a significant predictor of risky sexual behaviour. Its significance in both models underscore its influence in sexual decision making across heterosexual and sexual minority participants. In fact, sexual arousal was identified in the results of the systematic review reported in chapter 2 of this thesis, as having a detrimental effect on safe sex behaviours.

In Chapter 2, it was noted that it may be useful to measure sexual arousal longitudinally, as it may give more insight into how sexual arousal fluctuates in women. Due to attrition, the data collected longitudinally is sparse, and consequently, analysis on the data is limited. However, when looking at the relationship between sexual arousal and RSB across 30 days of the daily diaries, there was a significant correlation between the two variables. This also indicates that the initial measure of sexual arousal on Day 1 was a useful measure to be added into the models. Furthermore, given that the sample in this study were primarily heterosexual women in romantic relationships, it was not possible to look at the impact of sexual arousal on sexual behaviour with casual partners, which had been identified as a safe sex behaviour of particular interest in previous literature. Despite these issues, sexual arousal still emerged as a very powerful predictor of sexual risk in this study.

3.4.1.3 Fatigue

Fatigue was identified as a significant predictor of RSB, both in the overall model and in the individual state model. Interestingly, itself and sexual arousal were the only significant predictors in the state-only model. This would also stand to indicate that regardless of sexual or gender minority status, tiredness is a highly impactful factor in sexual risk taking. According to Engle-Friedman (2014), tiredness can impact risk-taking in two ways; ability to engage in effortful behaviour is decreased, thereby lowering the likelihood of engaging in risk, or inhibitions are lowered due to reduced cognitive resources, thereby increasing the likelihood of engaging in risk. Studies investigating the impact of tiredness or fatigue have explored the latter of the two hypotheses and have found evidence to support it. A meta-analysis published in 2013 reported that the majority of included papers found that sleep loss was positively associated with risk taking behaviour (Womack et al., 2013). These findings can also be situated within the dual process's framework: according to Millar et al. (2019), tiredness situationally causes deficits in executive functioning and cognitive control, while simultaneously exacerbating the processing of emotionally salient cues. Millar and colleagues reported that in a study on sexual risk taking amongst gay and bisexual men, tiredness increased sexual desire in approximately a third of their participants. They also reported that condomless anal sex more often occurred at, or later than, the participant's usual time for feeling tired.

These findings together indicate that tiredness can both increase sexual arousal, and increase the likelihood of sexual risk taking, potentially due to reducing cognitive control. Furthermore, Millar (2017) commented that a lack of sleep can increase sexual arousal, and/or can also reduce the capacity to self-regulate or inhibit sexual arousal. This may well be the process at play in the data in this study, particularly considering sexual arousal and fatigue were the only significant predictors in the individual state model.

It is worth noting that while the age range of the current study extended past college age, a large portion of the recruitment for this study was conducted on a university

campus and the mean age of participants for this study was 23 years. College aged students are often identified as having poor sleep patterns, due to unique stressors and demands that emerge at this age (Lao et al., 2016). This may also provide some insight as to why fatigue was so impactful on RSB in this study.

3.4.1.4 Emotional Affect

An index of emotional affect was identified as a significant predictor in the overall model, namely General Distress, a subscale from the Anxiety-Depression Distress Inventory (ADDI). Scores on the General Distress subscale have been associated with scores of negative affect and depression (Garcia et al., 2018). Moderate associations have also been found between General Distress and scores of anxiety, OCD and paranoia (Garcia et al., 2018). Previous literature has reported a link between measures of psychological distress and sexual risk: for example, a study of emerging adults reported condom use inconsistency was highest amongst participants with high psychological distress (Pittman et al., 2021). The same study also linked psychological distress and past year STI diagnosis, such that past year STI histories differed significantly by level of psychological distress.

3.4.1.4.1 General Distress and Sexual Minority Status. General distress was not a significant predictor in the state-only model when sexual minority status was accounted for. This indicates a link between General Distress and sexual minority participants, which is supported by the minority stress theory (Meyer, 2003). This theory seeks to explain the specific social, psychological, and structural variables that contribute to mental health inequalities faced by sexual minority individuals. The theory describes distal stressors, which originate from people or institutions, and include discriminatory policies, chronic stressors (for example, living in poverty) and everyday experiences of discrimination (Meyer, 2003). The theory also describes proximal stressors which arise from socialisation processes, leading to internalised stigma, expectations of rejection and identity repression.

The theory underlines that minority stress is distinct from general stress that all people experience. The added burden of minority stress in the lives of sexual and gender minorities posits this community as being at a greater risk of negative health outcomes than cisgender, heterosexual populations (Frost and Meyer, 2023). This includes a greater risk of negative mental health outcomes, such as suicidality and a higher prevalence of mood and anxiety disorders (Mongelli et al., 2019).

It is noteworthy that the two predictors that were not significant when sexual minority status was accounted for, albeit they were in different models, are Hated Self and General Distress. Both of these factors have been related to psychopathology in previous research. It is however, important to caveat this point considering that there was no measure of psychopathology in this study. Similarly, the fact that sexual minority status was recoded into a single variable reduces what is a vast range of complex, and potentially conflicting, experiences and identities into a blunt measure of sexual orientation and gender identity. It could well be the fact that one or two individual groups under the umbrella of the LGBTQ+ population are driving these results, which are then becoming conflated with the rest of the population. It is still, however, important to recognise that a range of queer identities have been associated with increased risk of mental illness in previous literature including gay men, bisexual and queer women, and transgender men and women (Wilson et al., 2022; Su et al., 2016; Malik et al., 2023). It has also been discussed at length in the literature the social factors that lead to the prevalence of ill mental health amongst the queer community, such as that explored in the minority stress framework. Public health campaigns and interventions looking to address safe sex in some capacity within queer populations should acknowledge the knock-on impacts of poor mental health and associated variables on the assessment of risk.

3.4.2 Significance of State Variables in Risky Sexual Behaviour

That three of the four significant predictors in the overall model were state-level variables is extremely relevant to public health and sexual education initiatives. As evidenced by the results of this study, individuals are heavily impacted by situational variables when making decisions about their sexual safety. In situations where individuals are sexually aroused, a level of sexual myopia can occur, creating a 'cognitive short sightedness' which can lead to lowered inhibitions and increased risk taking (Ditto et al., 2006; Skakoon-Sparling et al., 2016). Sexual arousal, when combined with a state of tiredness, and/or negative emotional arousal, can lead to situations where an individual is cognitively under-resourced and makes decisions with reduced cognitive processing power. It is also noteworthy that Hated Self was the only significant trait predictor, and that its impact was eliminated once sexual minority status was accounted for. This may indicate that for the general population, when individuals are making decisions around sexual safety, the factors that are most impactful are those that occur within the moment. When public health campaigns or interventions are looking to address safe sex behaviours in more specific populations, looking at factors related to Hated Self may improve outcomes, including the likes of esteem, sexual self-efficacy, and self-worth.

3.4.3 The Predictive Ability of Delay Discounting in Sexual Domains

Delay discounting, as represented by percentage of sooner, smaller choices, did not contribute to the model, and predicted none of the variance in risky sexual behaviour. When looked at in combination with state factors, trait factors, and a combination of both, its predictive power was not improved, as was posited in the introduction of this chapter. In fact, the results of this study demonstrated no correlation between scores of delay discounting and risky sexual behaviour. At first glance, it may seem surprising that an indicator of risky or impulsive decision making is not significantly associated with a specific risky behaviour. However, this finding is supported by previous research which

has indicated that delay discounting may not be an appropriately accurate indicator of sexually risk decision making (Johnson et al., 2021). These findings are also supported by the results of the systematic review reported in Chapter 2 of this thesis; specifically, that when measuring a specific type of decision making, such as that in sexual contexts, it may be more useful to use a measure that has a meaningful and relevant outcome measure. It is important to note that the systematic review and the study reported in this chapter were being conducted in parallel, both of which were looking to explore measurement of decision-making in sexual behaviour, albeit in different ways. As a result, delay discounting was included in this study in order to investigate if the predictive power of monetary delay discounting, which had been reportedly weak according to results from Chapter 2, could be bolstered by a model inclusive of state and trait variables.

Delay discounting of monetary outcomes has been related to some clinical behaviours in previous research, such as cocaine use and gambling (Heil et al., 2006; Wölfling et al., 2020). Monetary delay discounting has also been found to be a reliable indicator of impulsivity and self-control. However, it is apparent from the results of this study, as well as from a wealth of recently published literature, that monetary discounting may lack the domain specificity for capturing the nuance within sexual discounting (Lawyer & Schoepflin, 2013). For example, it has been noted that the relationship between delay discounting and clinical outcomes can be improved when the outcomes being discounted are relevant to the individual, that is, when investigating the relationship between delay discounting and sexual behaviour, the discounting measure should be evaluating the discounting of sexual outcomes (Johnson et al., 2021). A recently published systematic review (Gebru et al., 2022) reported that more general decision-making measures, such monetary discounting and the Iowa Gambling Task (IGT) are indicators of a more general risky decision making from which sexually risky decision making may be distinct. The same review concluded that when measuring sexual risk, it may be more

appropriate to rely upon more specific measures to quantify sexually risky decision making, such as sexual discounting or sexual vignettes. Similar results emerged from Chapter 2 of this thesis; analysis of the literature on sexual decision making indicated the domain specificity of discounting, such that the paradigm of discounting can be leveraged to investigate specific clinical outcomes, such as sexual decision making. As such, the more relevant the discounting paradigm is to the clinical outcome of interest, the better the paradigm can capture the specific type of decision making involved in the discounting of that outcome. The review reported in Chapter 2 mirrors the results of this chapter and concludes that domain specific sexual discounting and sexual vignettes are best suited at capturing the specificity of sexual decision making. Similarly, measures such as monetary discounting or the IGT are best suited to capturing a general process of decision making.

These findings provide further support for the previously asserted idea that sexual decision making is distinct from other types of health-related decision making. Lawyer and Schoepflin (2013) reported that discounting for sexual activity, but not monetary outcomes, differentially predicted sexual excitability. Other research has also reported that discounting for sexual outcomes was associated with sexual risk behaviours (Johnson & Bruner, 2012). Furthermore, it has been reported that men with compulsive sexual behaviour disorder (CSBD) displayed no significant differences in IGT responses compared to controls (Engel et al., 2025). This result would indicate that amongst a clinical group who experience disruptions in sexual decision making, a general decision-making task such as the IGT is not adept at identifying differences in domain specific sexual decision making in a clinical group. Due to the apparent difference between sexual decision making and decision making in other health domains, future research seeking to measure domain specific sexual decision making should choose appropriate measures to capture such decision making.

3.4.4 Fit of the Developed Model

While the overall model, which consisted of state and trait variables, was a good fit of the data, the predictive power of the model was not an improvement from previous research. Furthermore, three of the four significant predictors in the model were state variables (Sexual Arousal, Fatigue and General Distress). This finding expands upon previous research investigating the impact of state variables on sexual risk; previous research has indicated that situational factors may be critical in advancing understanding of sexual risk (Mustanski, 2007).

3.4.5 Potential Limitations

While there are many strengths of this piece of research, there are also some limitations that are important to acknowledge. Firstly, while efforts were made to diversify the sample in terms of sexual orientation and gender identity, the majority of participants identified themselves as being women, heterosexual and white, with most participants completing third level education. Despite a concerted effort to engage with groups and organisations concerned with the safety and welfare of queer and trans people specifically, recruitment of this population was extremely difficult. It is important to note that this may be as a result of the wider social context for queer and trans people at the moment. Trans people have come under increased scrutiny over the past number of years, with a recent study reporting that trans people across 30 European countries consistently report greater discrimination and violence than cisgender LGB people (Evje et al., 2024). It has been reported in the past that there is a degree of mistrust among the queer community of health services in general, which may extend to health research, particularly as it pertains to sexual behaviour. Historically, the sexual behaviour of queer people has been medicalised and stigmatised, and has been associated with other deviant, and often illegal forms of sexual behaviour. Queer romantic relationships are often both hyper-sexualised and misunderstood, even by health care professionals. Both individuals from the queer

community and organizations concerned with their welfare may have been reluctant to engage in and share this research, for fear that it would misrepresent and further stigmatise patterns in sexual behaviour and associated decision making amongst queer people. Therefore, it may be essential for future research to engage with key stakeholders from sexual and gender minority groups early in the research process, in order to give them an opportunity to feed into the research. This may also facilitate the building of trust between the research team and the communities they are recruiting from.

It is also important to note, that while sexual and gender minorities were collapsed into one category in order to facilitate further analysis between groups, some authors have argued against this practice. Taggart et al. (2019) commented that reducing the diverse group of gender and sexual minorities into one discrete category reduces the nuance that exists between sexual minority sub cohorts. It is also noteworthy in this case, that in the individual state and trait models, sexual minority status was not a significant predictor. While collapsing the variables of sexual orientation and gender identity in this way was done in order to facilitate further analysis, it may be the case that this is simply too blunt a representation of sexual minority status. Therefore, as stated previously, future research concerned with exploring sexual behaviour in sexual and gender minorities should make a concerted effort to engage with and recruit as many LGBTQ individuals as possible.

While recruitment for this study proved to be difficult, attrition was also a significant issue in data collection. Measures were employed to try and combat this; namely the use of incentives and reminder alerts within the app if participants hadn't completed one of the daily diaries. However, these measures ultimately did not work, as a high percentage of participants didn't move over to the app to complete the daily diaries. Of those that did download the app, a high percentage did not meet 85% engagement with the daily diaries. As a result, it was difficult to conduct meaningful analysis on the longitudinal data, as there was too much missing. Furthermore, as the majority of

participants were either in monogamous relationships (52%), or single and not dating (24%), there was a lack of variance in the risky sexual behaviour scores, which likely impacted the results.

3.5 Conclusion

The results of this chapter highlight the influence of state-level variables on engagement in sexual risk. This study utilises a novel study design to explore relationships, both cross-sectionally and longitudinally, which help to predict sexually risky behaviour. The results also indicate factors that may be particularly relevant to the sexual risk behaviour of sexual and gender minorities. This information can be used to inform and strengthen sexual education and public health campaigns and interventions. In general populations, attention should be given to the short sightedness that can be caused by situational variables, such as sexual arousal and tiredness. In gender and sexual minority groups, attention should be given to the impact of self-depreciative attitudes. An awareness that the causes of these attitudes may be structural, and largely outside of the control of individuals is also imperative.

Furthermore, these findings strengthen the findings of Chapter 2; that monetary delay discounting may lack domain specificity when looking at particular health outcomes. In the context of the overall thesis, these findings indicate that subsequent studies investigating decision making in sexual behaviour (detailed in Chapter 4) should use measures that are more attuned to the specificity of decision making in sexual contexts.

Chapter 4.1 Introduction

4.1.1 Context of this Chapter

Rates of sexually transmitted infections (STIs) have been climbing steadily over the past number of years, particularly among 18–30 year-olds, in Ireland, Europe (Nerlander et al., 2023), and America (Kreisel et al., 2021). There have been efforts made from a public health perspective to counteract this rise with an increase in public knowledge and awareness of the risks of STIs. A report evaluating the National Sexual Health Strategy (NSHS) of 2015-2020 in Ireland (Crowe, 2023) emphasised sexual health as a key public health issue and concluded that the new NSHS requires an evidence-based Model of Care to continue to develop accessible and effective sexual health services. While the report recognised the progress that has been made since 2015 and underscores the value of an overarching sexual health strategy, rates of STIs have been increasing steadily since 2015, particularly gonorrhoea and chlamydia. The report also acknowledged a need for more targeted interventions for use with certain groups, such as those over 40 and transgender people, specifically citing a spike in STIs among people over 40 years old.

At an EU level, the European Centre for Disease Prevention and Control (ECDC) published a report in 2024, detailing a sharp increase in gonorrhoea cases from 2015-2023 among women aged 20-24 across Ireland and 14 other EU countries. This was identified as cause for concern in the report, as gonorrhoea can result in pelvic inflammatory disease, chronic pain, and infertility. The ECDC suggested a number of actions in this report, emphasising the importance of increasing awareness of the risk of STIs among young people, the importance of condom use, and recommending that social media be utilised in public health communications. This latter recommendation is supported by research by Riddell et al. (2024). They reported that the rise in digital technologies have resulted in increased access to information in a range of contexts, including sexual health, though the information may not always be of a high quality. In line with this, a sexual wellbeing

campaign had already been in progress in Ireland, with a particular push on social media channels, in order to target 17-30 year-olds, who had been identified as being at risk for STI diagnosis and transmission (Health Protection Surveillance Centre [HSPC], 2024).

Despite perceiving their own risk of contracting STIs as low, young people experience higher rates of STIs and barriers to sexual healthcare (Riddell et al., 2024). A protective behaviour that is often targeted in sexual health interventions is the use of physical barriers during sexual behaviours, such as condoms or dental dams. Research conducted in Ireland reported that cost is one factor that influences contraceptive choice amongst sexually active college students, with condoms being used by just 55% of those surveyed (McConnell et al., 2021). This may imply that cost represents a barrier to consistent condom use. Another important point to consider is the Free Contraception Scheme offered by the HSE to women and people with a uterus between the ages of 17-35. This scheme has been in existence since 2022, and provides free GP appointments about contraceptive options, free emergency contraception, and covers the cost of a range of hormonal contraceptives and long-acting reversible contraceptives, such as IUDs. However, despite previously noted high levels of STIs, and the finding from McConnell et al. (2021) that cost may be a barrier to consistent condom use, condoms and other physical barriers are not covered by the Free Contraception Scheme or any other government funded scheme. According to Citizens Information, free condoms can be availed of at STI clinics, some sexual health NGOs, and third level institutions. However, there is no provision of condoms, or any other physical barriers, covered by a government funded scheme. While the Free Contraception Scheme stands to advance the accessibility of reproductive healthcare to women and those with uteruses, the lack of provision of physical barriers does represent a barrier to accessible and comprehensive sexual healthcare.

4.1.2 Sexual Communication Self-Efficacy

Sexual communication self-efficacy (SCSE), defined as confidence in discussing sexual health, pleasure and limits, has been identified as an important determinant of sexual behaviour (Quinn-Nilas et al., 2016). Sexual communication has been associated with indicators of risk reduction, such as use of condoms and contraceptives (Quinn-Nilas et al., 2016; Widman et al., 2006). Importantly, sexual communication has also been associated with other indicators of sexual wellbeing, such as sexual and relationship satisfaction (Roels & Janssen, 2020) and dimensions of sexual function (Mallory et al., 2019). Pariera (2018) reports that peer sexual communication is associated with higher sexual self-efficacy and self-esteem but can also be associated with higher normative perceptions of risky sex. It has been noted that while there is a link between sexual knowledge and decision making, this relationship is not always direct or linear. Therefore, including attitudes and self-efficacy may help further illuminate the relationship.

4.1.3 Sexual Health Priming

Priming involves activating a mental representation by external cues, which can affect information processing and behaviour (Papies, 2016). Priming has often been studied in health promotion research, whereby health information is shared with participants in order to see its effect on subsequent health behaviour in the same domain as the prime, including in cardiovascular health, healthy eating, and cigarette smoking (Ma et al., 2011; Forwood et al., 2015; Harris et al., 2014). Priming has been identified as a strategy for improving health communication in public health. Health communication itself is defined as sharing health related knowledge and combating misinformation, raising awareness, and facilitating people to make informed choices about their health and behaviour (Riddell et al., 2024). A number of studies have investigated priming in sexual behaviour. Cheng and Chiou (2018) investigated the impact of sexual primes on rates of monetary delay discounting and cyber delinquency and reported that male participants who

had been shown photographs of ‘sexier’ women demonstrated greater rates of discounting than participants who had been shown images of ‘less sexy’ women. An older study (Gagnon & Godin, 2000) used short vignettes to portray AIDS as either a lethal or chronic disease, before asking participants to complete measures of condom use and its determinants. Gagnon and Godin reported that when AIDS was depicted as a chronic disease, participants’ anticipated negative feelings following unprotected sex with a new partner were lower than when it was depicted as a lethal disease. This may indicate negative feelings could be reduced if the outcomes of AIDS were communicated differently.

Collado et al. (2016) investigated the impact of priming a state of sexual satiation and a state of sexual deprivation on participants, in order to evaluate the impact of these states on risky sexual behaviour. This was achieved by asking participants to read short vignettes depicting the cognitive, emotional, physical, and temporal aspects of sexual behaviour in either a deprived or satiated way. For example, in the sexual satiation condition, participants were asked to imagine they were in a sexually fulfilling relationship, their emotional needs were being met, and they were regularly engaging in enjoyable sexual behaviour with their partner. The opposite was described for the sexual deprivation condition. The researchers reported a gender difference in response to the sexual primes. Males, compared to females, demonstrated an increased willingness to engage in riskier sexual behaviours with high desirability partners, but only when sexually deprived. This effect was not observed in women. As mentioned in Chapter 2, there may be gender differences in sexual priming, as men and women respond to sexual stimuli differently (Crosby et al., 2021). Overall, sexual priming is an effective way to measure the impact of sexual stimuli on behaviour and can be utilised in a way that reveals meaningful differences between participants in terms of their propensity towards sexual risk.

4.1.4 Sexual Delay Discounting

As described in Chapter 2, experimentally, a number of methodologies have been developed to capture sexual decision making and the evaluation of sexual risk in laboratory environments, including delay discounting. As has been explored in previous chapters, delay discounting refers to the extent to which people demonstrate a preference for smaller immediate rewards, over larger, delayed rewards (Weinsztok et al., 2021). Previous research has suggested that greater sensitivity to individual pathology is detected when the outcomes being discounted are clinically meaningful (Johnson et al., 2021); for example, results from a sexual delay discounting (SDD) task are more predictive of sexual outcomes, rather than monetary outcomes. Similarly, conclusions from Chapters 2 and 3 support the assertion that paradigms such as vignettes and sexual discounting are better equipped at measuring a decision making specific to sexual domains.

Delay discounting of sexual outcomes has been investigated in a variety of cohorts and has been found to correlate highly with self-reported sexually risky behaviours. A systematic review published in 2021 reported that sexual decisions are highly dependent on delay, and that delay and probability (as measured by probability discounting) contribute to sexual risk across clinical and non-clinical populations (Johnson et al., 2021). Rates of sexual discounting correlate strongly with other measures of discounting, including monetary delay discounting and probability discounting, indicating there may be a shared mechanism of discounting across outcome types (Lawyer et al., 2013). However, rates of sexual discounting correlate much more strongly with other measures of sexual behaviour, such as condom use (Sweeney et al., 2020), indicating the way risk is evaluated in sexual decision making is distinct from risk evaluation involved in other types of decision making.

A task frequently used in experimental contexts to measure sexual discounting is the Sexual Discounting Task (SDT; Johnson & Bruner, 2012). This task evaluates the

effect of delay on the likelihood of choosing to wait a specified length of time to have sex with a condom over immediately having condomless sex. Within the SDT, participants indicate from a list of individuals who they would consider having sex with. From this new list, participants then choose the individuals they would most like to have sex with, least like to have sex with, and to choose the individuals who they think are most and least likely to have an STI. Each person selected for each of the four categories is then presented as a hypothetical sexual partner, and participants are asked to indicate on a visual analogue scale (VAS) of 0-100 their likelihood of having sex with the hypothetical partner. For the first trial of each partner, participants indicate the likelihood of having protected sex with the partner. For the following seven trials, participants are asked to indicate the likelihood of them waiting a specified delay to have protected sex with the partner. The delays changed from 1 hour, 3 hours, 6 hours, 1 week, 1 month and 3 months, consecutively. The SDT has been used to measure sexual delay discounting in several cohorts, including populations with substance abuse issues, men who have sex with men (MSM), and college students.

As explored in Chapter 2, sexual discounting has been examined amongst MSM populations; Hahn et al. (2019) used the SDT to compare discounting rates between MSM and heterosexual men, reporting that when compared to heterosexual men, MSM in committed relationships demonstrated higher rates of discounting for condom protected sex, and discounting rates correlated highly with other self-reported risk behaviours, such as condom use, impulsivity and substance use. Despite various studies employing the SDT amongst gbMSM populations, studies investigating sexual discounting in other non-heterosexual samples, particularly gay and bisexual women who have sex with women (gbWSW) are limited. In fact, several studies report excluding women who chose hypothetical women partners from analysis, as the focus of the study was on an aspect of sexual behaviour for which gbWSW would be considered very low risk, such as HIV

transmission or condom use (Sweeney et al., 2020; Lemley et al., 2018). This is in spite of the fact that there are contexts in which gbWSW can use condoms, including if a sexual partner has a penis, and condoms are often recommended for use when sex toys are being shared (Sexual Wellbeing: Intimate Relationships for Lesbian, Bisexual & Queer Women, n.d.). Dental dams are also commonly recommended for use to gbWSW populations, although they are rarely used by this population (Toman & Wesche, 2025). Similarly, gbWSW can be at risk of developing specific STIs, due to a lack of education and awareness of gbWSW-specific safe-sex practices (Takemoto et al., 2019). Furthermore, the author is unaware of any published empirical study which has specifically utilised sexual discounting in gbWSW, resulting in a dearth of information in the literature as to how this demographic group discount sexual outcomes.

4.1.5 Vignettes

Sexual scenarios, or vignettes, are another useful method for measuring sexual decision making, whereby participants are asked to imagine themselves in hypothetical sexual scenarios and are asked to indicate their likelihood of engaging in particular behaviours of varying sexual risk in the scenario. Like sexual discounting, this measure had been identified in Chapter 2 as a suitable measure of domain specific sexual decision making. Responses on vignettes are normally scored on a Likert scale type. Hypothetical sexual scenarios have been used to measure sexual decision making, and how risk is evaluated in sexual contexts. For example, a paper published in 2021 (Skakoon-Sparling & Cramer), reported that higher sexual arousal was associated with greater sexual risk-taking intentions, as measured by hypothetical scenarios. Skakoon-Sparling and Cramer (2021) also reported that lower scores of inhibitory cognitions predicted higher scores of sexual risk-taking intentions, as measured by the hypothetical scenarios.

Hypothetical sexual scenarios have had limited use with non-heterosexual populations. Skakoon-Sparling and Cramer (2019) used vignettes to measure sexual risk-

taking intentions amongst MSM, alongside men who have sex with women and women who have sex with men, but excluded gbWSW as their research was focused on the use of condoms on a flesh penis. GbWSW however, as discussed, are a very diverse group, and there are circumstances under which gbWSW may use condoms, either as protection with sex toys or with a flesh penis.

4.1.6 Rationale for Present Study

The rise in sexually transmitted infections necessitates research that investigates the impact of public health materials on sexual decision making. As such, the aim of this study was to investigate whether priming, such as that used in existing health messaging, can reduce risk in sexual decision making, as measured by sexual discounting and vignettes, and STI risk perception. To this end, participants were exposed to different health information primes and their impact on sexual decision making was examined. Sexual communication self-efficacy was included as a covariate in the analysis of priming condition and vignette scores. SCSE is expected to act as a significant covariate, as communication skills would be necessary in the situations described in the sexual scenarios. Should any unexpected results arise in the analysis between primes and vignettes scores, it is expected that SCSE may be able to shed some light on the nature of the relationship between the two variables. This experiment also extends on previous research by amending previous measures of sexual decision making, such as sexual discounting and hypothetical sexual scenarios, so that they are suitable with a range of groups, including heterosexual, gbMSM and gbWSW populations, and gender non-conforming participants.

The specific hypotheses for this experiment are as follows:

1. Scores of vignettes and sexual discounting will be lowest following exposure to the sexual health prime, followed by the general public health prime

2. Scores of vignettes and sexual discounting will be highest following exposure to the neutral prime.
3. Scores of STI risk perception will be higher following exposure to the sexual health prime and general public health prime, compared to scores following exposure to the control.
4. The impact of the health primes on scores of sexual discounting, vignettes and STI risk perception, will be more pronounced amongst men compared to women.

4.2 Methodology

This study took the format of a pre-experiment during which the materials for the study were developed, followed by the experiment itself. The methodology of the pre-experiment of this study will be described initially, before leading into the methodology of the experiment itself. The materials for this experiment were developed as part of a pre-experiment, which is reported below. An advisory group was also established to develop the materials for this experiment, which was described in more detail in Chapter 1.

4.2.1 Pre-Experiment Method

4.2.1.1 Design

This study was a cross-sectional survey. Materials were shown to participants and data were collected via Qualtrics.

4.2.1.2 Participants

Participants (n = 6) were recruited via posters that were hung around the Alice Reeves Building in DCU, and through online social media posts.

4.2.1.3 Materials & Setting

The vignettes that were shown to participants went through various stages of development. Some of the vignettes had been taken from previous research (Skakoon-Sparling & Cramer, 2016; Ross & Bowen, 2010). In order to ensure applicability of the

vignettes to all demographic groups, the hypothetical sexual partner in all vignettes was called ‘Sam’ and was referred to using ‘they/them’ pronouns. This decision was made in order to present ‘Sam’ as gender neutrally as possible, so that participants could decide for themselves the gender of the hypothetical sexual partner based on their own preferences. This ensured the vignettes were suitable for use with all populations. This draft of vignettes was then shown to the advisory group. The additional vignettes generated by the advisory group were also tested during the pre-experiment.

4.2.1.4 Procedure

Participants were shown 13 vignettes outlining hypothetical sexual scenarios. Participants were asked to rate each vignette on a scale of 1-10 on the following dimensions: plausibility, relevance, realism, level of risk, and how easy it was for participants to project themselves into the scenario. Participants were also asked if they had any other comments to make about the vignette, within a free text box.

Importantly, participants that took part in this component of the study were not eligible to take part in the second part of the study. Participants were made aware of this via the Plain Language Statements and Consent forms for both studies.

While participants did not answer the questions directly (that is, they did not answer how likely/unlikely they were to engage in the behaviour themselves), they were told that their responses were being used to develop materials for a later study. They were asked to not directly answer the question but rather to evaluate them on the dimensions described above.

4.2.1.5 Data Analysis

Descriptive statistics were conducted, including calculation of the mean rating for each item of each vignette, as well as examination of the free text responses given by

participants. Free text responses provided feedback on the vignettes and this alone, was noted and on some occasions used to amend the vignettes.

4.2.1.6 Outcome

As a result of feedback given by participants, two vignettes were removed from the study. One was removed as it was unclear if the behaviour described in the vignette was verging on coercive behaviour, as it was concerned with persuading someone to not use protection during sex. The second vignette that was removed, asked participants how likely they would be to trust someone attractive that says they're STI/HIV free. Participants appeared to find this confusing, as it may be implied that attractive people are untrustworthy, and they weren't clear on what exactly the question was asking them. Some small changes for the purposes of clarity were also made to some other vignettes.

4.2.2 Experimental Methods

4.2.2.1 Design

This study took the form of an experimental, within-subject repeated measures design. Participants were exposed to three primes, before completing measures of sexual decision making and a measure of STI risk perception after each prime. The order in which the primes were presented was counterbalanced across participants. As there were three primes, there were six ways that the primes could be ordered, or 6 pathways. Table 4.1 below demonstrates each way presentation of primes could be ordered. A schematic which highlights the experiment stages can be seen in Figure 4.1. The order of tasks was identical across each condition, other than the order of prime presentation. Participants also completed a distractor task after the general health and neutral prime that was related to that prime, in order to disguise the true purpose of the study. Data were collected via Qualtrics. Primes were shown to participants through a private, password protected website that was not accessible to the public.

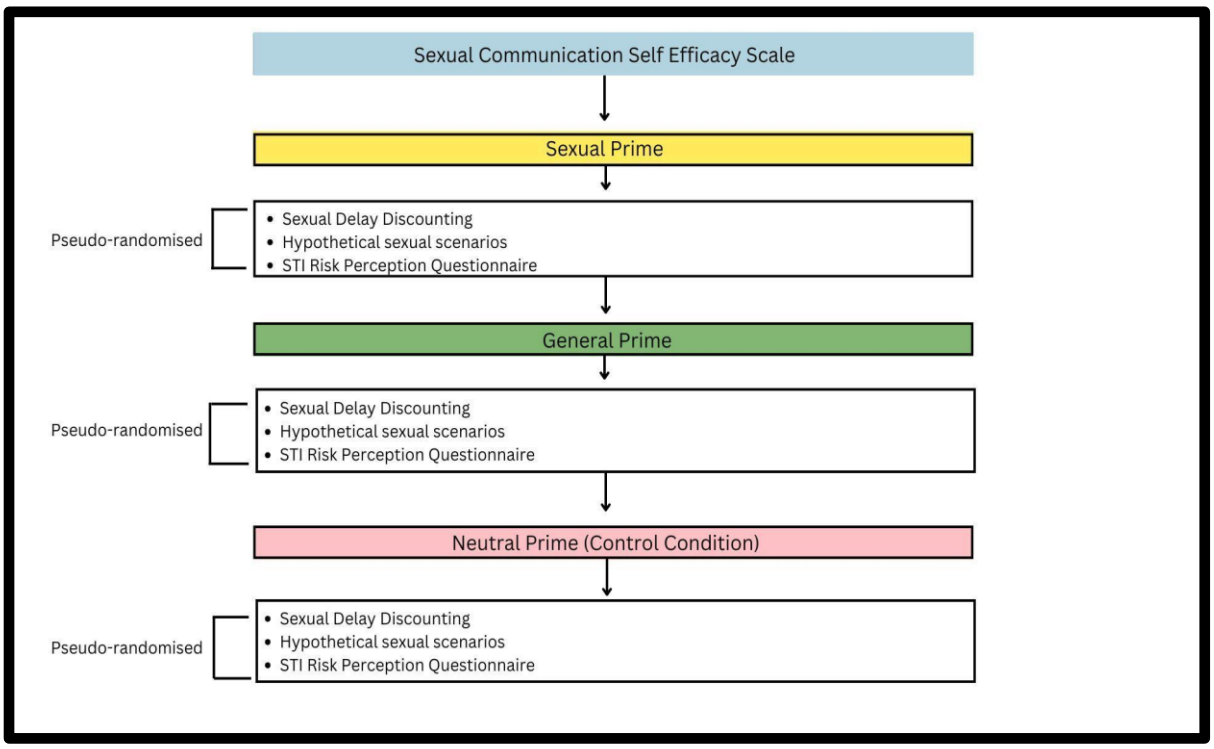
Table 4.1

The order of prime presentations in each of the 6 possible prime pathways. Prime pathways were counterbalanced across participants in order to control for order effects.

	Pathway 1	Pathway 2	Pathway 3	Pathway 4	Pathway 5	Pathway 6
First Prime Seen	Sexual Health Prime	Sexual Health Prime	General Health Prime	General Health Prime	Neutral Prime	Neutral Prime
Second Prime Seen	General Health Prime	Neutral Prime	Sexual Health Prime	Neutral Prime	Sexual Health Prime	General Health Prime
Third Prime Seen	Neutral Prime	General Health Prime	Neutral Prime	Sexual Health Prime	General Health Prime	Sexual Health Prime

Figure 4.1

The logic of the experiment for Pathway 1.



4.2.2.2 Participants

Participants were recruited via recruitment posters that were hung around the DCU campus. The study email address was included on the poster, and participants who were interested in taking part could get in touch with the researcher. Posts were also shared on Twitter/X, Instagram, and LinkedIn. Snowballing also played a significant role in the recruitment strategy.

Seventy-three participants completed the study. The inclusion criteria of this study were that participants must have been between the ages of 18-30 and must have been fluent in English. Participants were mostly undergraduate students at DCU and had to be between the ages of 18-30. Of the 73 participants, seventy-two provided full consent. Full consent was not obtained from an additional individual, so their data was deleted, thus leaving seventy-two participants. Data from a further two participants did not record properly because of issues with the platform, and another participant picked the wrong gender in

one of the sexual discounting tasks, meaning the images of the hypothetical partners that were shown to them were not of the gender they were attracted to. This meant the data was unusable. These three participants were also excluded from analysis, thus leaving sixty-nine participants in the final analysis.

The mean age of the remaining 69 participants was 22.79 years of age (SD = 3.18; range: 18-29). The majority of participants identified themselves as women (65.2%), and heterosexual (56.5%). One participant, when asked to identify their gender, described themselves as 'Other', and when asked to provide further detail, identified 'No Identification (genderqueer)'. Similarly, two participants indicated 'Other' for sexual orientation; one described themselves as 'Unsure' and another indicated they felt they may be queer. A full break-down of participant characteristics can be found in Figures 4.5 and 4.6.

Figure 4.2

Breakdown of participant gender identity by percentage.

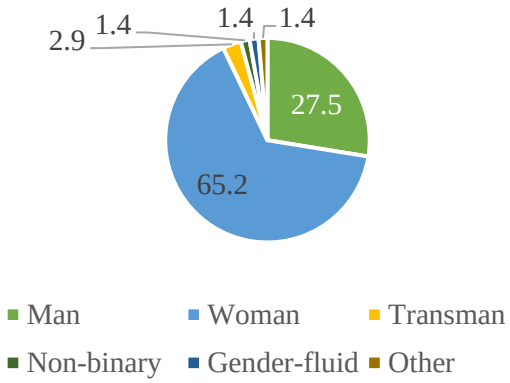
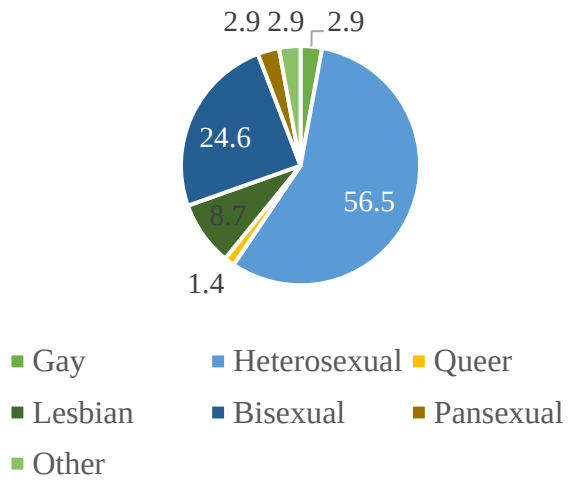


Figure 4.3

Breakdown of participant sexual orientation by percentage.



4.2.2.3 Materials and Settings

Participants took part in this experiment in an experimental cubicle in the research laboratory of the School of Psychology, DCU. Participants completed measures of sexual decision making (sexual discounting and vignettes), STI risk perception and distractor tasks. A description of each measure is as follows.

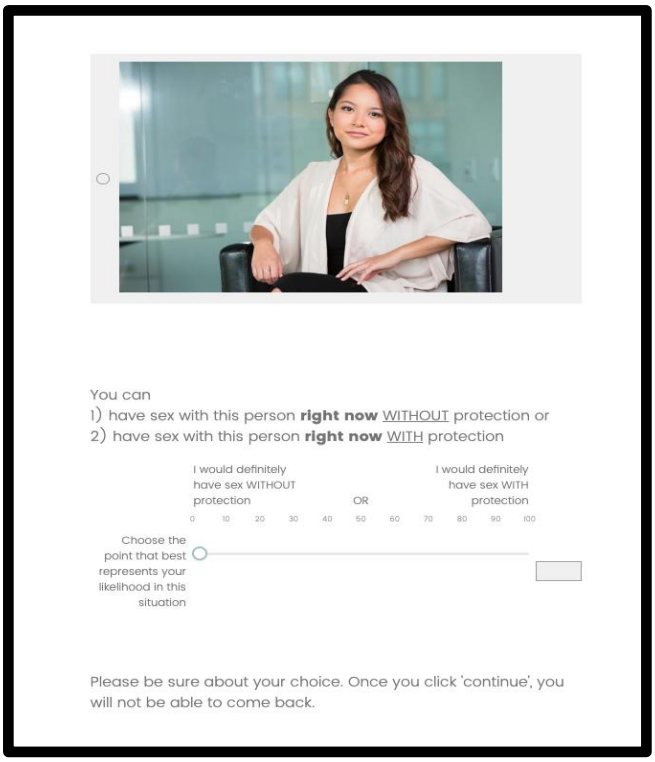
4.2.2.3.1 Sexual Discounting. The images used in this task were obtained from Wongsomboon and Robles (2017) paper, and upon an author of this paper's advice, additional images were added to the set of stimuli in order to improve the racial diversity of individuals in the images. Forty images (20 men, 20 women) were obtained from the contacted author, and an additional 20 images (10 men, 10 women) were obtained from a range of copyright free image databases, such as Pexels and Pixabay. These images can be found in Appendix I. Additionally, upon the advice of the contacted author, images of individuals with varying attractiveness and perception of STI risk were chosen for use in the experiment. This author also recommended running a pilot study on the new images, which was done. An example of a trial of the SDT can be seen in Figure 4.4.

The format of this discounting task followed that of Johnson and Bruner (2012) and Gebru and Wongsomboon (2023). Participants completed the measure using Qualtrics.

Participants were asked to indicate who they were generally sexually attracted to: men, women or both. They were then shown 30 images of either men or women depending on which they chose, or 60 images if they chose both. Participants were then asked to exclude any individuals with whom they would never have sex with under any circumstances, based on physical appearance alone. They were also informed at this stage that a minimum of four images must remain unselected in order to progress onto the next stage of the experiment.

Figure 4.4

An image of a trial on the Sexual Discounting Task.



4.2.2.3.2 Distractor Tasks. Participants were also shown distractor questionnaires in the general health and neutral condition, that were related to the primes shown in that condition. The distractor questionnaire for the general health condition consisted of quiz-style questions about sun safety and recycling, for the general health and neutral conditions respectively. These questions were included in the study to try to distract participants from

the true purpose of the study. ChatGPT was used to generate the questions. Data were not analysed from these questions. These questions can be found in Appendix J.

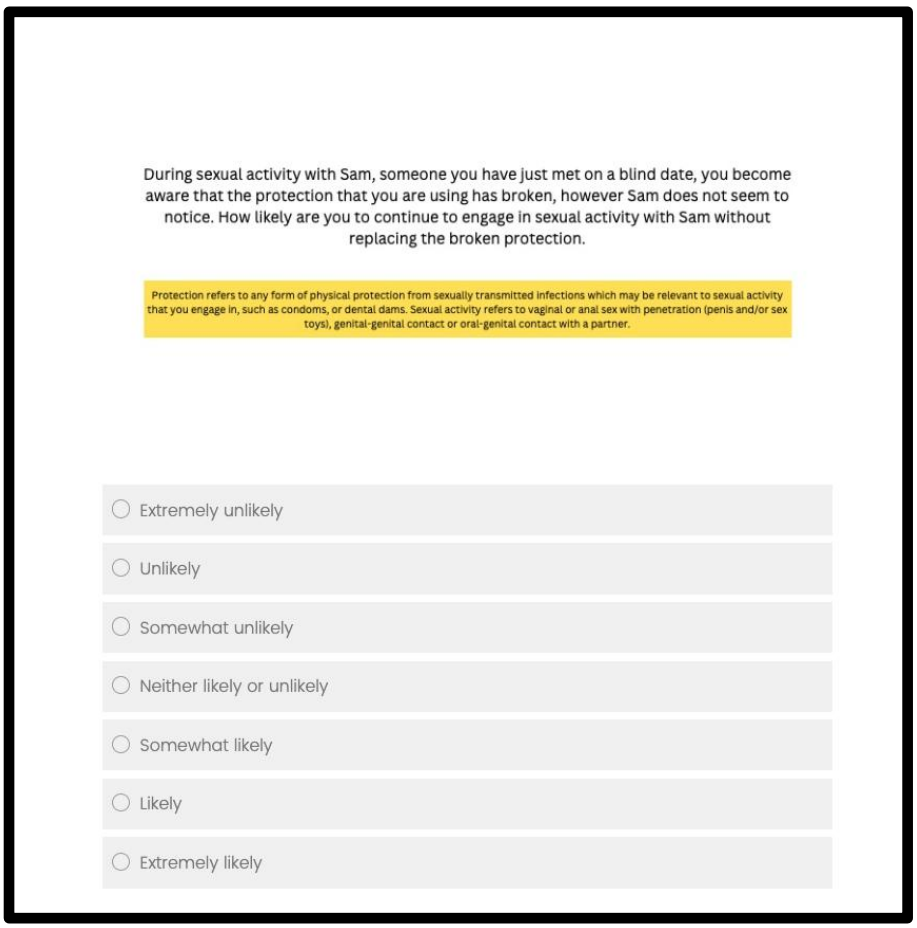
4.2.2.3.3 Sexual Communication Self-Efficacy. The Sexual Communication Self-Efficacy Scale (Quinn-Nilas et al., 2016) was used to measure sexual communication self-efficacy. This is a 20-item scale, where participants indicate on a scale of 1-4 how easy they find it to discuss certain topics with sexual partners. This questionnaire can be found in Appendix K. Cronbach's alpha was .89 for this scale.

4.2.2.3.4 STI Risk Perception Questionnaire. Participants were asked to complete the STI Risk Perception questionnaire (Collado et al., 2017), which measured their perception of the risk of contracting an STI. The measure consists of 3 items, where participants are asked to indicate how likely they are to contract an STI from unprotected oral, vaginal and anal sex on a scale from 1-10. This questionnaire can be found in Appendix L. Cronbach's alpha for this scale for the sexual prime condition was .69, the general health prime condition was .73, and the neutral prime condition was .7.

4.2.2.3.5 Vignettes. Vignettes that had been developed as part of the pre-experiment were presented to participants on a computer screen and were hosted on Qualtrics. The vignettes were presented as JPEGs that had been made in Microsoft PowerPoint. Vignettes were presented this way so that the definition of protection and sexual activity could be highlighted and shown to participants alongside the vignette (Figure 4.5). As reported previously, this was considered to be important by the advisory group, as both definitions are very specific, and we wanted to avoid participants becoming confused or misremembering the definitions. After they answered the question, they were shown the next vignette. Cronbach's alpha for the sexual prime condition was .88, for the general health prime condition was .88, and for the neutral prime condition was .89. The full list of vignettes can be seen in Appendix M.

Figure 4.5

Example of presentation of one of the vignettes as seen in the experiment.



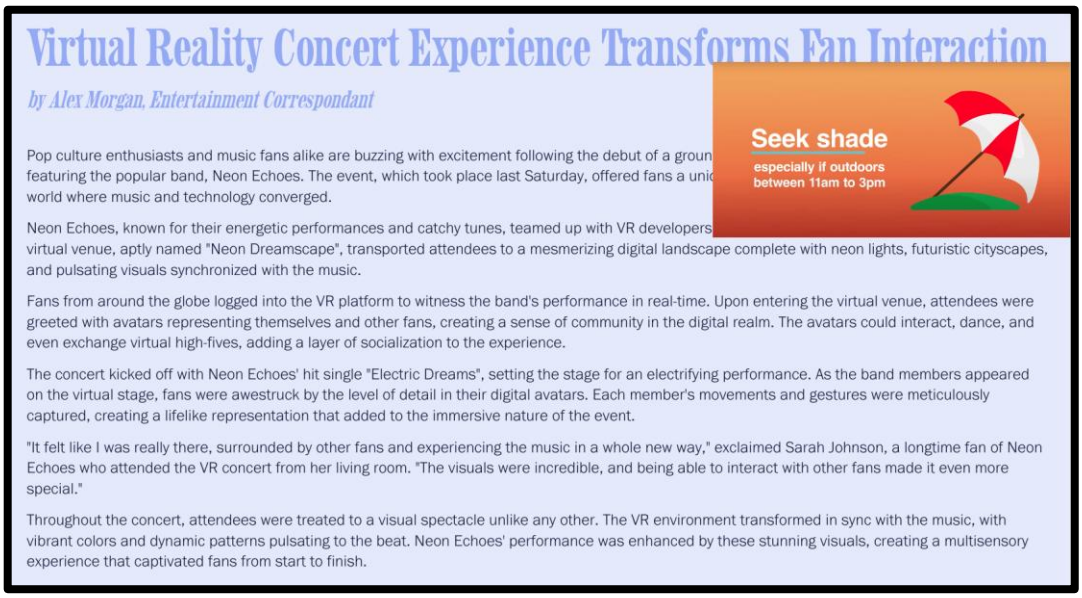
Prior to being shown the vignettes, participants were told they were about to read some short scenarios and that they were being asked to insert themselves into each scenario. Participants were asked to indicate after every question, the likelihood of them engaging in that behaviour.

4.2.2.3.6 Primes. The prime related to sexual health was taken from the Sexual Health and Crisis Pregnancy Programme's campaign encouraging condom and dental dam use. The general health prime was taken from the HSE's SunSmart campaign, encouraging sun safe behaviour, such as wearing sunscreen and wearing a wide brimmed hat in the sun. The neutral prime was taken from Recycling List Ireland, promoting the correct recycling of various materials. The news articles that the primes were shown alongside were

completely fictitious, related to celebrity gossip, and generated by ChatGPT. Squarespace was used to build and host the website. The websites were designed to have bright colour, to replicate the branding of other celebrity gossip websites. The website was called PopPulse and had a consistent font and colour scheme across the websites, in order to give the impression that each of the articles were from a legitimate celebrity gossip website. Combination of the news article and prime was pseudo randomised, in order to minimise order effects. A screenshot of the embedded general health prime can be seen in Figure 4.6.

Figure 4.6

An image of the embedded general health prime on the gossip article.



4.2.2.4 Procedure

4.2.2.4.1 Pilot Study. This study was piloted with six participants before full data collection began. The data from three of these participants were retained. The data from the remaining three participants was not used, as there were issues in the logic of the experiment, disrupting the integrity of the data. These logic issues were subsequently resolved. Some changes were also made to the Likert scales on the vignette, following this piloting. Previously, participants answered the vignettes on a 5-point Likert scale. Following the pilot, this was expanded to a 7-point Likert scale, in order to account for responses where participants would be extremely unlikely or likely to engage in a particular behaviour. The three pilot data responses that were retained, were rescored on the vignettes, in order to align them with the new Likert scale.

4.2.2.4.2 Experiment. At the outset of the experiment, participants were assigned and given their Participant Number, which was needed to track participants' responses across Qualtrics files. The Participant Number was generated using a number generator on Google. Participants numbers took the form of 'PXXX', and the numerical values ranged from 0 (P000) - 120 (P120). Participants were also made aware of a password which they needed to get access to the websites containing the primes. This information was left on a sticky note so that participants would have both pieces of information to hand, as they would be asked to provide this information every time they viewed the prime, and every time they were redirected back into Qualtrics to complete the outcome measures and distractor. The sticky note was destroyed once participants finished their experiment. The student researcher explained the purpose of the study to the participants at this stage, the information on the sticky note, and provided participants with an opportunity to ask any questions or withdraw if they felt uncomfortable. No participants withdrew consent at this stage.

Once the researcher left the room, participants began the experiment. Participants were firstly presented with a Plain Language Statement and Consent form. In order to meet the inclusion criteria for the study, participants had to reply in the affirmative for each question in the Consent form. If participants did not respond in the affirmative at this stage, they were redirected to the end of the experiment and were not permitted to participate. At this stage, participants were also asked to provide demographic information, such as their age, sexual orientation, and gender identity. Following provision of demographic information, participants completed the measure of Sexual Communication Self Efficacy. Participants were then automatically redirected to a website containing their first prime.

Primes were presented to participants one at a time. Participants were exposed to three primes in total: a prime relating to sexual health, general health, and a neutral prime related to recycling. Participants were instructed at the outset of the experiment that they could spend as much time as they wished scrolling through the news article. The prime played as a hanging video on the top right-hand side of the screen as they scrolled down the page. There was no sound to the video, and it started to play automatically as soon as participants arrived on the website. Participants could pause the video if they wished. This was a setting of the platform used to publish the website and was unchangeable. This does present as a limitation, as participants could theoretically pause the videos and avoid watching the whole thing. Once participants had reached the end of the page, or wanted to move on, there was a link at the bottom of the page that took them to Qualtrics, where the next part of the experiment took part.

Once participants were redirected to Qualtrics, they were asked to input their Participant Number. Participants were then asked to complete distractor questions (if they were in the General Health or Neutral conditions). These distractor questions were included in order to distract participants from the true nature of the study, particularly

because they were required to complete the sexual outcome measures three times. Following completion of the distractor questions, if relevant, participants completed the dependent measures, sexual decision-making tasks. Order of the tasks were counterbalanced across conditions. The procedure for each of the individual tasks is detailed further below.

Once participants had completed the dependent measures, they were redirected back to the next prime, where the procedure would repeat itself, until participants completed the dependent measures after the third and final prime. After this point, participants were asked if they noticed each individual prime. Participants were then shown the Debriefing form and were thanked for their participation in the study.

4.2.2.4.3 Sexual Discounting Task (SDT). The procedure for the SDT followed that of Johnson and Bruner (2012) and Wongsomboon and Gebru (2017). At the outset of the task, participants were asked to indicate who they were generally sexually attracted to men, women or both. They were then shown 30 images of either men or women depending on which they chose, or 60 images if they chose both, as per previous research (Wongsomboon & Robles, 2017). Participants were then asked to exclude any individuals with whom they would never have sex with under any circumstances, based on physical appearance alone. They were also informed at this stage that a minimum of four images must remain unselected in order to progress onto the next stage of the experiment. At least four images were required for the task to work.

After excluding images of individuals they would not have sex with, participants were asked to choose one individual for each of the following partner conditions: 1) the person they most want to have sex with (MSW) 2) the person they least want to have sex with (LSW) 3) the person most likely to have an STI (MSTI) 4) the person least likely to have an STI (LSTI). The same picture could be selected for two conditions, however the

same picture could not be selected for conflicting conditions, for example, the same image could be selected for ‘MSW’ and ‘LSTI’, but the same image could not be selected for ‘MSTI’ and ‘LSTI’. These images were then used in each of the four partner conditions in the sexual delay discounting paradigm. Before continuing onto the next part of the experiment, participants also had to indicate on a scale of 1-10 how attractive they thought the individuals they had selected for each partner condition were.

Presentation of the four partner conditions was counterbalanced across participants. For the first trial in each of the four partner conditions, a zero-delay condition was presented, where participants indicated the likelihood of engaging in immediate sex without a condom or immediate sex with a condom on a visual analogue scale (VAS) ranging from 0% (I will definitely have sex with this person now without a condom) to 100% (I will definitely have sex with this person now with a condom). On the very first trial of the first condition, participants were shown a practice trial for the SDT, to ensure they understood how to use the VAS. For the seven trials following the zero-delay trial, participants chose between hypothetical sex with the shown partner immediately without a condom versus sex with the same partner after a specified delay when physical protection (condom or a dental dam) is available. The seven consecutive delays are 1 hour, 3 hours, 6 hours, 1 day, 1 week, 1 month, 3 months.

Partner presentation was randomised, but delays were presented consecutively for each partner. Participants responded to the zero-delay and delay trials for each of the four partner conditions, even if the same photograph was selected for more than one category.

4.2.2.4.4 Vignettes. Participants were shown each of the 11 scenarios one at a time in a quasi-random order such that each was shown once. Prior to being shown them, participants were told they were about to read some short scenarios and that they were being asked to insert themselves into each scenario. After reading each one, participants were asked to indicate their likelihood of engaging in a particular behaviour, for example, whether they would use a condom in the situation being described. Participants indicated their likelihood on a scale of 1-7 (1= 'Extremely Unlikely', 7= 'Extremely Likely'). Five vignettes were reverse scored, such that 1= 'Extremely Likely', 7= 'Extremely Unlikely'. Higher scores on this measure indicated more protective decision making.

4.2.2.4.5 STI Risk Perception. Participants rated how likely they believed it would be to contract an STI from vaginal, anal, or oral sex, on a scale of 1-10, as presented on a VAS. Each of the three options was pseudo randomised and presented to participants in a list. Higher scores on this measure indicated greater perception of STI risk.

4.2.2.5 Ethical Considerations

Ethical approval was granted to this study by the Research Ethics Committee in DCU, and the letter of approval can be found in Appendix N.

4.2.2.5.1 Data Management. While participants indicated their interest in taking part in the experiment over email, their email addresses were not stored alongside their responses to the experiment. Furthermore, once data collection had ceased, emails between the researcher and the participants on the study specific email were deleted. Participant emails were only stored on the study email address. Once participants came into the School of Psychology research labs to complete the study, they were immediately given a participant number so that they could not be identified from their data.

4.2.2.5.2 Withdrawal from Study. Participants were informed both in the PLS and verbally by the researcher that they were free to withdraw from the study for any

reason, which they did not have to disclose to the researcher. However, they were also informed that once they left the School of Psychology research offices, their data would be no longer distinguishable from anyone else's, and as such withdrawing from the experiment would not be possible at that stage. This information was shared with participants in the PLS, confirmed verbally with the researcher, and was in the debriefing form. Participants also had to indicate on the consent form that they understood the process of withdrawing their data.

4.2.2.5.3 Subject Matter of Study. As the nature of this study is to measure sexual behaviour and decision making, participants may have found this uncomfortable. As such, participants were informed as part of the Plain Language Statement of the sexual nature of the study, and the fact that they were free to withdraw from the study at any point without fear of judgement. Participants were sent the Plain Language Statement (PLS) via the study email ahead of their participation in the study. Furthermore, as part of the consent forms participants had to verify that they were 18 years of age or older, and that they understood the types of questions they would be asked as part of the study. Both of these facts were also confirmed verbally with participants before they began the study. In the case that a participant became upset, contact details for the student researcher and supervisors of the research were provided on the PLS and the Debriefing form. Participants were given an opportunity at the end of the experiment to raise any questions or concerns they had with the researcher. They were also informed they could get in touch with the researcher over email if they would prefer. Furthermore, if a participant had serious concerns about the research, contact details for the DCU research ethics committee (REC) were provided on the debriefing form. Similarly, contact details for Samaritans, DCU Counselling and sexual health resources were provided on the Debriefing form.

4.2.2.5.4 In-Person Data Collection. As participants completed the study in the laboratory in the School of Psychology, participants met the researcher in person. This was

partly protective, as it ensured that if any problems arose, the researcher was on hand to any questions or provide reassurance. It also secured safety of the data, as all data was collected in the School of Psychology research offices. However, there was a risk that as the data was being collected in person, that participants may have found this embarrassing, as they were identifiable to the researcher.

4.2.2.6 Data Analysis

A repeated measures ANOVA was conducted to test the impact of priming conditions on the scores of STI risk perception. A repeated measures ANCOVA was conducted to measure the impact of the priming condition on scores of the vignettes, with sexual communication self-efficacy included as a covariate. A non-parametric equivalent of a repeated measures ANOVA, a Friedman's test, was conducted on the sexual discounting data (AUC values), due to the data not being normally distributed. A Friedman's test was conducted to test the impact of the priming condition on AUC values. A second Friedman's test was conducted to test the impact of partner condition on AUC values.

A power analysis was calculated using the G*Power calculator. The analysis was calculated for repeated measures ANOVA, using an effect size of 0.25 (medium), revealing a minimum sample size of 43 participants.

4.2.2.6.1 Dealing with Non-Systematic Responding on the SDT. Area under the discounting curve (AUC) is used to assess the magnitude of the sexual delay discounting function in this study, as per previous research (Wongsomboon & Robles, 2017). Smaller AUC values indicate a greater delay discounting of protected sex, or relative preference for immediate unprotected sex. Participant responses on the SDT were divided by 100, in order to convert the scale from 0-100 to 0-1, as per Mitzel et al. (2023). Non-systematic responses also had to be removed. Non-systematic discounting values were identified

starting at the 1-hour delay trial, if any delay rating was 0.2 greater than the previous trial's response, as per the algorithm from Johnson and Bickel (2008). If participants had only one non-systematic response in a set of delay trials for a particular partner, the response was replaced with the average of the previous and subsequent discounting value, following procedures from previous research (Collado et al., 2017; Dariotis & Johnson, 2015; Mitzel et al, 2023).. If the replaced value was still greater than 0.2 greater than the preceding discounting value, or if there was more than one non-systematic value per partner, the data for that partner condition was excluded from analysis. In the event that only the final response was non-systematic, the value was replaced with the discounting value from the second last trial.

4.2.2.6.2 Calculating Unstandardised Area Under the Curve. Raw or unstandardised AUC was calculated based on the method described in Mitzel et al. (2023), who referenced the method established by Myerson et al. (2001) The y-axis ranged from 0 to 1 to represent the likelihood of having protected sex. The x-axis ranged from 0 to 1, expressed as a fraction of the time delay of the trial expressed in hours, divided by the maximum number of hours in the final delay condition, which was 3 months (2160/2160 hours; 3 months = 2160 hours). This value on the x-axis was used to represent delay to protection availability across the eight trials. Responses to each trial were entered into the equation [y1 + y2]/2*[x2-x1] and summed together to represent the raw AUC value. To distinguish between participants with similar AUC values and enhance precision in analyses, all AUC values were allowed up to 15 decimal places for analyses, but data were rounded to 2 decimal places for presentation of results. The values for each of the four values to be imputed into the sexual discounting equation are as follows:

y1 = the likelihood of having protected sex in the first trial

y2 = the likelihood of having protected sex in the current trial

x1 = time delay from the first trial (in this study, always 0)

x2 = time delay from the current trials (expressed as a fraction of 2160)

4.2.2.6.3 Calculating Standardised AUC. The purpose of calculating standardised AUC scores is that it allows for controlling of individual differences in protection use intentions when the delay is 0. It is calculated the same way as raw AUC values, except that the y values for the delay trials are standardised by dividing the value for each delay trial by the response to the zero-delay trial. If standardised responses result in values greater than 1, values were capped and replaced with a value of 1. Data were excluded from analyses where the initial intentions were zero, as dividing by zero is undefined.

4.3 Results

4.3.1 Preliminary Data Analysis

Sixty-nine of 73 participants were retained in the primary analyses.

4.3.1.1 Acceptability Checks

4.3.1.1.1. Sexual Communication Self-Efficacy. Standard normality checks were conducted on the SCSE scale, the vignettes (in each prime condition) and STI risk perception (in each prime condition) data. SCSE (M = 59.54, SD = 8.97) satisfied all the normality checks, including Kolmogorov-Smirnov test, a normally distributed histogram, a linear Q-Q plot, and a normal boxplot. As SCSE was to be included as a covariate, heterogeneity across regression slopes was also checked for the STI risk perception and vignette variables. The regression slopes were roughly the same across conditions.

4.3.1.1.2 STI Risk Perception. The sexual priming condition of the STI risk perception variable had a non-significant Kolmogorov-Smirnov, with the general and neutral condition violating the assumption. Histograms and Q-Q plots from all conditions

were relatively normal, with all box plots displaying some outliers. As visual indicators of normality were mostly acceptable, no changes were made to the outliers in the STI risk perception variable.

4.3.1.1.3 Vignettes. All conditions of the vignettes had negatively skewed histograms. The sexual condition violated the Kolmogorov-Smirnov test, and the neutral and general conditions were approaching violation. These variables also violated visual indicators of normality, with the boxplots displaying a number of outliers. A number of transformations were conducted on the data. The data from the sexual health prime and neutral health prime conditions were cubed. This significantly improved the normality of the data, such that the histograms were greatly improved, the Kolmogorov-Smirnov tests were both unviolated and there were no longer outliers visible from the boxplot. As such, the scores for the general health prime also had to be cubed. The Kolmogorov-Smirnov test was still significant, but the boxplot was improved.

4.3.1.1.4 Sexual Delay Discounting. Normality checks were also conducted on the sexual discounting data, with checks being conducted on each partner condition x priming condition group (12 groups). Each of these groups violated visual checks of normality and Kolmogorov-Smirnov tests. As such, a Friedman's Test was conducted in place of a repeated measures ANOVA. Opting for a non-parametric test rather than replacing extreme values with the mean follows previous research on non-normal sexual discounting data (Mitzel et al., 2023).

4.3.2.1 Orderliness of Sexual Discounting Data

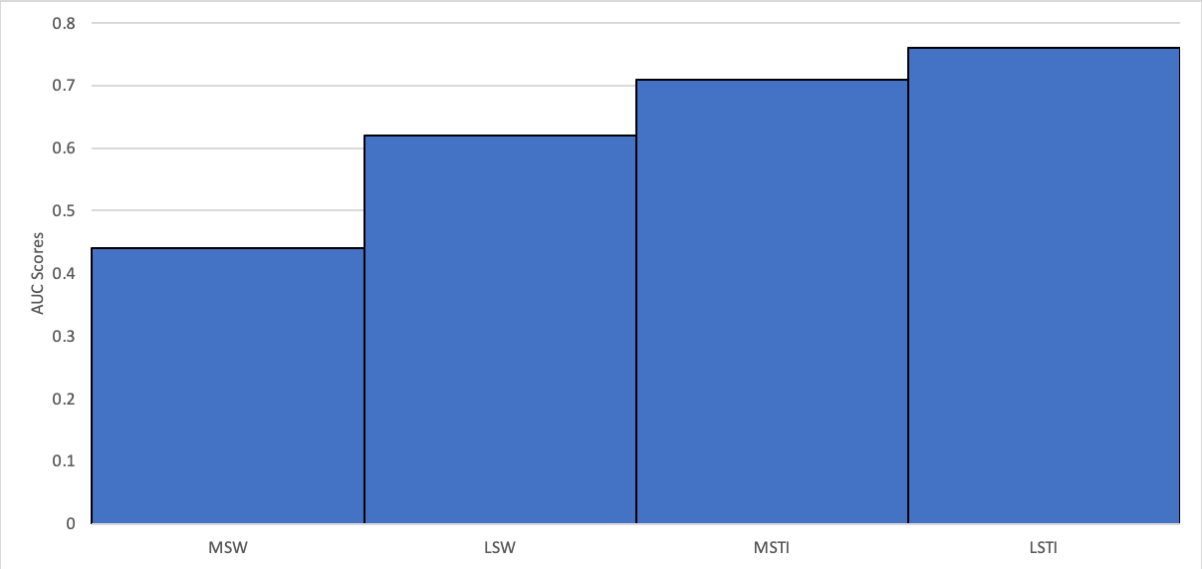
Across 828 sexual discounting functions (69 participants x 4 partner conditions x 4 priming conditions), 157 (18.96%) were identified as having at least one non-systematic response. After applying the corrections described in the methodology, 13 participants were removed. As such, 56 participants were retained in further analyses. Examination of

the impact of partner conditions on rates of sexual discounting across priming conditions revealed significant differences between groups.

Due to the non-normality of the sexual discounting data, a non-parametric equivalent of a repeated measures ANOVA, a Friedman's Test, was conducted in order to investigate the differences between the partner conditions. This test was conducted in order to ensure that the partner conditions did impact discounting rates of participants as predicted. The results of the Friedman Test indicated a statistical difference in sexual discounting scores across the four partner conditions (MSW, LSW, MSTI, LSTI; $X2$ (3, n = 168), $p < .001$). There was a small effect size for this test, Kendall's $W = .211$. Inspection of median values showed MSW was associated with the lowest AUC values (highest discounting of condom protected sex; Md = .44), followed by the LSTI condition (Md = .62), then MSTI (Md = .71) and finally LSW (Md = .76). Figure 4.7 displays the median AUC values for each partner condition. Post-hoc tests revealed that there were significant differences at the $p < .01$ level between each partner condition, except the difference between the MSTI and the LSW condition, which was not significant (p = 1). This indicates that participants responded as expected to the sexual discounting paradigm, in that partner conditions significantly impacted discounting rates. Also noteworthy is that participants discount condom protected sex with less desirable partners and partners with a higher risk of transmitting an STI in much the same way. Predictably, participants discount condom protected sex the most for partners who are most sexually desirable, compared to the other conditions, with partners with the lowest risk but still sexually desirable being the next most discounted partner condition.

Figure 4.7

Median AUC Scores Across Sexual Delay Discounting Partner Conditions



4.3.2 Impact of Priming on Vignettes

A repeated measures ANCOVA was conducted, in order to test the impact of prime condition on scores of the vignettes, while controlling for SCSE. SCSE was included as a covariate in this analysis, as it was predicted that sexual communication skills would be associated with responding on the vignettes, as the scenarios require communication with a hypothetical sexual partner. Despite this, the ANCOVA revealed that the covariate was not significantly related to scores of the vignettes, $F(1, 67) = 2.63$, $p = .109$. Following Mauchly's Tests, it was observed that the assumption of sphericity was intact. The results of the main ANCOVA were non-significant [$F(2,134) = .352$, $p = .704$], indicating that the priming conditions had no impact on the scores of the vignettes. The effect size was negligible (eta = .005). The interaction between the covariate and the vignettes was also not significant, $F(2,134) = .311$, $p = .733$. Figure 4.8 displays a histogram of the adjusted means across each priming condition. Estimated marginal means and standard errors for the vignettes at every priming condition were: sexual health prime: M = 241,080.1, SE =

14,376.39; general health prime: M = 238,459.986, SE = 14,692.097; neutral prime: M = 236,858.957, SE = 13,796.766. Table 4.2 displays estimated means and standard deviation of vignette scores across priming conditions.

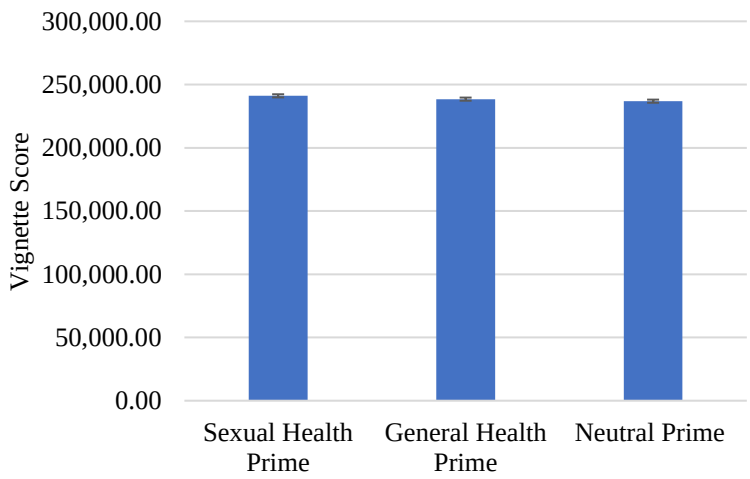
Table 4.2

Means and standard deviations (where reportable) from each priming condition across each primary measure.

Priming Condition	STI Risk Perception		Vignette		AUC
	Mean	SD	Mean	SD	Median
Sexual Prime	20.76	5.24	59.84	12.74	0.44
General Health Prime	21.1	5.44	59.64	12.58	0.39
Neutral Prime	20.91	5.34	59.97	12.5	0.46

Figure 4.8

Mean Scores of Vignettes Across Priming Conditions

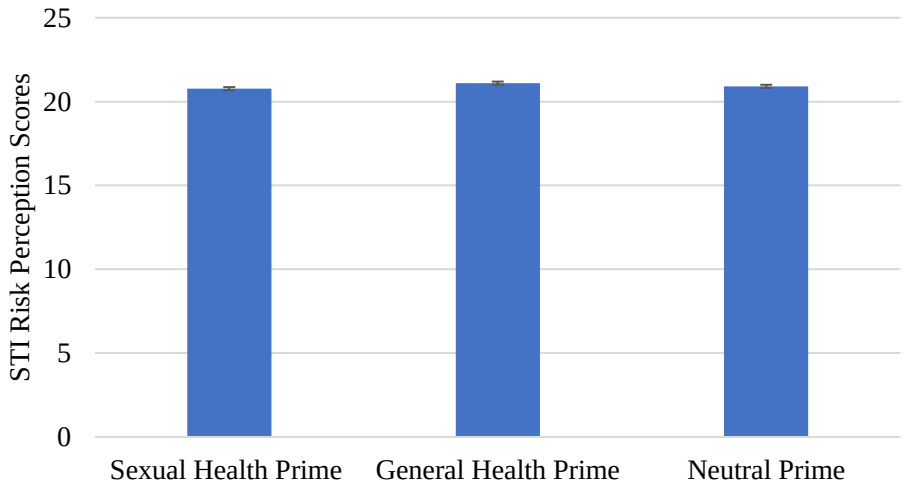


4.3.3 Impact of Priming on Perception of STI Risk

A repeated measures ANOVA was conducted in order to test the impact of prime condition on perception of STI risk. Mauchly's Tests indicated that the assumption of sphericity was violated. The Huynh-Feldt estimate (value = .914) was used to correct this violation. The ANOVA revealed that the prime condition had no significant impact on scores of STI risk perception, $F(1.83, 124.27) = 1.086$, $p = .336$. The effect size for this ANOVA was also very small (eta = .016). The estimated marginal means and standard error for the priming conditions were: sexual health prime: M = 20.77, SE = .631; general health prime: M = 21.1, SE = .655; neutral prime: M = 20.91, SE = .643. Figure 4.9 displays a histogram of the estimated marginal means for vignettes in each priming condition.

Figure 4.9

Mean Scores of STI Risk Perception Across Priming Conditions



4.3.4 Impact of Priming on Sexual Delay Discounting

A Friedman Test, the non-parametric equivalent of a repeated measures ANOVA, was conducted in order to test the impact of priming conditions on scores of sexual delay

discounting, as indicated by the unstandardised AUC scores. A parametric repeated measures ANOVA was not suitable because of the non-normality of the AUC data, as reported previously. The previously used covariate, sexual communication self-efficacy, was not used. This is due to the fact that non-parametric tests had to be used with the sexual discounting data, and which placed limitations on the available tests. Accounting for a covariate in a non-parametric model would have significantly increased the complexity of the model and comprised the interpretability of the rests. As such, the covariate was not included in this analysis. The results of the Friedman Test indicated that there was no difference in rates of sexual discounting across the three conditions, X2 (2, n = 56) = 1.330, p = .514. The effect size for this test was very small, (Kendall's W = .012). Inspection of the median values showed that the general health prime resulted in the lowest AUC scores (higher discounting of condom protected sex; *Md* = .39), followed by the sexual health prime (*Md* = .44), with the neutral prime resulting in the highest AUC scores (*Md* = .46). Figure 4.10 displays the median AUC values across the priming conditions. However, these differences were not at a significant level. As such, post-hoc tests were not analysed.

Figure 4.10

Median AUC Scores Across Priming Conditions

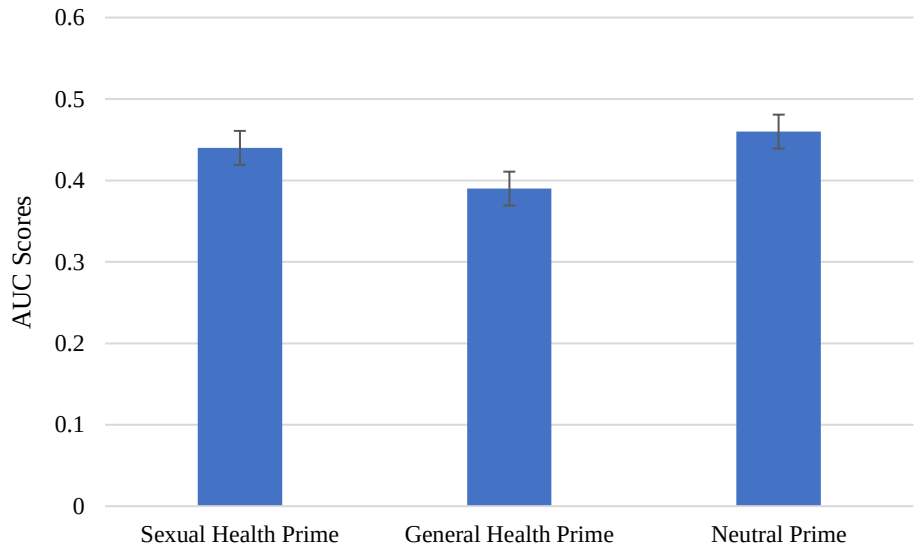


Table 4.3

Percentage of participants who noticed experimental primes.

Priming Condition	Yes	No	I don't know
Sexual Health Prime	87	13	-
General Health Prime	55.1	40.6	4.3
Neutral Prime	69.6	27.5	2.9

4.3.5 Visibility of Primes

When asked if they noticed the primes they had been shown following the experimental session, 4.3% (n = 3) of participants did not notice any of the primes. Only 47.8% noticed each prime. Most participants noticed the sexual prime (87%), and none of the participants indicated that they weren't sure if they had seen the sexual prime. Just under 70% of participants noticed the neutral prime, and 55.1% noticed the general health prime. A full breakdown of responses can be seen in Table 4.3.

4.4 Discussion

4.4.1 Impact of Priming Conditions on Outcome Measures

The aim of this experiment was to investigate if three priming conditions (sexual health, general health, neutral) would significantly impact indicators of sexual decision making (measured using sexual delay discounting and sexual vignettes) and STI risk perception. Contrary to the hypotheses of this experiment, results of this experiment revealed no significant differences between priming conditions. In fact, on the STI risk perception measure, the sexual health prime was associated with the lowest risk perception

scores, albeit at a non-significant level. Similarly, on the SDD task, the sexual and general health primes were associated with higher discounting of condom protected sex than the control, again, at a non-significant level. Both of these outcomes contradict the hypotheses of this study. The sexual and general health primes were associated with more protective decision making on the vignettes, as compared to the control. Similarly, sexual communication self-efficacy, which was included as a covariate in the analysis of the priming conditions on vignette scores, was not associated with a significant result. SCSE did not significantly contribute to the analysis as a covariate and did not account for any of the variance between priming conditions and vignette scores.

These unexpected results may be due to a number of factors. Firstly, the lack of significant results is potentially due to a lack of power. While power analyses indicated approximately 80-100 participants were required to power the statistical analyses, only 69 participants were retained for analysis. Additionally, 13 participants were removed from the sexual discounting data due to non-systematic responding. This left 56 participants in the final analysis of AUC scores. While a significant result with a reasonable effect size was still noted in the analysis investigating the impact of partner condition on AUC scores, this sample size may have been too small to detect any reliable differences between priming conditions.

4.4.2 The Impact of Health Primes as Health Promotion Materials

An alternative explanation for the non-significant findings in this study may be that the sexual health materials used in this study simply did not generate any immediate increased awareness of sexual risk, and as such did not motivate any change in sexual decision making or a change in STI risk perception. However, an important point to note may be that the design of the study may not have allowed enough time or the proper conditions for the prime to work. Friedman et al. (2016) noted in their review of sexual

health campaigns that greater behaviour change was observed where there was greater exposure of materials to participants. One study included in the review found that effects of the campaign only began to subside 3 months following exposure, but that the targeted behaviour (condom use) will still be higher than in control populations. Friedman and colleagues also noted that social media campaigns were found to augment stand-alone condom distribution programs and community STD testing programmes.

The purpose of public health messaging may not be to immediately disrupt a process as complex and automatic as decision making. Rather, the purpose of public health materials may be instead to increase awareness and knowledge of behavioural health risks within a population over time, and to slowly initiate behaviour change. Indeed, posters with sexual health information may be one component of an overall strategy of behaviour change in an area of public health. Additional components could include increased STI testing, and free or subsidised methods of contraception. For example, in Crowe's (2023) review of Ireland's National Sexual Health Strategy (NSHS), there were recommendations to increase the dissemination of the SHCPP's resources and materials, as well as an increase in outreach with marginalised or hard to access groups, such as those with disabilities, older people and the LGBTQ+ community.

Similarly, Friedman et al. (2016) commented that successful sexual health campaigns are accompanied by increased access to goods and services, as well as policy changes that buttress behaviour change. Sewak et al. (2023) conducted a review of studies investigating the efficacy of digital sexual health campaigns targeted towards adolescents. They reported that studies that exclusively used social media channels had mixed results. Of the two papers that met this criterion, one was not associated with any behaviour change (Dulli et al., 2020). However, of the studies that used a combination of digital and non-digital tools, two-thirds were effective in motivating behaviour change. Evans et al. (2020) also reported that repeated exposure to promotion materials is essential to the

success of a condom promotion programme. Furthermore, Evans and colleagues noted that there was a need in campaigns looking to target adolescents and young people, to shift promotional materials to channels most used by this cohort, such as social media.

Notably, the HSPC reported that in Ireland STIs decreased in 2024 by 11%, compared to 2023. This marks the first time there has been a decrease in year-on-year rates of STIs since 2019. This trend is continuing in 2025, with a decrease of 9.3% being noted in the first 26 weeks of this year compared to the same period last year. This coincides with the promotion of the HSE's Sexual Wellbeing and Man2Man campaigns, which offers information on STI prevention, free condoms, and resources for gbMSM (HSPC, 2025). This action was recommended by the Crowe review, and has presumably over time increased awareness of STIs, particularly among specific groups, such as MSM and WSW who were specifically targeted by some materials, as can be seen in Figure 4.11 and Figure 4.12.

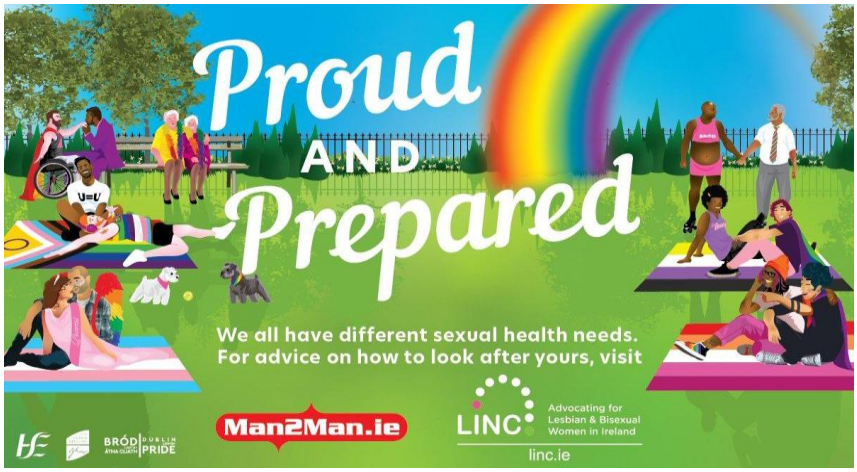
Figure 4.11

Sexual health promotion poster for syphilis among gbMSM



Figure 4.12

Sexual health promotion poster for queer people



It would stand to reason that sexual health materials would have had some visible impact on participants' responses. However, the fact that responding on the outcome measures was no different to controls immediately after viewing the prime may indicate some issues with the materials used. The fact that the general health prime, materials taken from the HSE's SunSmart programme, also had very little impact on responding might indicate similar efficacy issues across the two primes. For example, in a study by Gagnon and Godin (2000), AIDS was portrayed via vignettes as either a lethal or chronic disease, before participants were asked about their intentions to use condoms with a new sexual partner. The information had a significant impact on condom use intentions. Similarly, Macapagel et al. (2017) investigated the impact of gain and loss framed messages on sexual decision making. Loss framed messages communicated the risks of not using condoms and gain framed messages communicated how condom use can lead to positive outcomes. Participants viewed a message before completing a computerised sexual decision-making task. Macapagel and colleagues reported that compared to the gain framed message, the loss framed message was associated with lower intentions to have sex. Message order also had a significant effect on responding. Granted, the health primes

in this study did not have the same amount of information on it as that by Gagnon and Godin, and Macapagel and colleagues, and the health primes in this study were videos. However, both primes were explicitly encouraging protective health behaviours, and the sexual health prime specifically included information about rising rates of STIs in Ireland in 2022.

4.4.3 Impact of Primes on Sexual Delay Discounting

While participants' AUC scores did not respond to the priming conditions as expected, participants' AUC scores across partner conditions within the SDD measure were in the generally expected direction. There was no hypothesis within this study as to how participants would respond to the partner conditions, as there was no research question pertaining to this. However, within the literature on SDD, it is generally reported that participants would discount condom protected sex the most for the MSW condition, as this partner is the one to whom they are most attracted (Johnson et al., 2021). The next highest AUC score is expected to be LSTI, as it would be expected that a low risk of STI transmission would not necessitate waiting for a condom. The MSTI and LSW conditions generally result in the lowest levels of discounting, as participants are not as eager to engage in sex with these partners. The results of this study do provide further support for this pattern of responding across partner conditions, particularly within a cohort of Irish young adults. As far as this author is aware, this is the first time sexual delay discounting has been investigated in an Irish population.

Additionally, the differences between partner conditions were significant, except for the LSW and MSTI conditions. It is also important to note that as participants did respond to partner conditions, it is likely that this task was not underpowered. Additionally, only the AUC values from the MSW condition were entered into the analysis of the priming conditions (as has been done in other research). Considering this was a condition

where participants did display significant patterns of discounting, it may be expected that this condition would be responsive to the primes. The non-effect of the primes on AUC values may indicate that this sexual health prime did not have any immediate impact on sexual decision making.

4.4.4 Unsuitability of Sexual Communication Self-Efficacy as a Covariate

Sexual communication self-efficacy was not a significant covariate in the relationship between priming condition and scores on the vignettes. This result indicated it had no relationship with sexual decision making, as measured by the vignettes. Similarly, the interaction between SCSE and priming condition was non-significant, indicating that the combined effect of SCSE and prime offered no insight into the vignette scores either. The mean score for the variable is 59.54. The scores on this scale (M = 59.54) are relatively similar to SCSE scores from the study reported in Chapter 5 (M = 60.48) and mean scores from other populations, for example Polish samples (M = 62.22), Black and Latino individuals in America (M = 59; although they removed an item) (Liberacka-Dwojak & Wiłkość-Dębczyńska, 2023; Carter et al., 2022). This is surprising; while previous research hasn't investigated SCSE and sexual vignette scores specifically, there is some suggestion that there may be an insightful relationship between the two. Safe sex communication has been identified as a key component of increased safe sex behaviour, such as increased condom use and increased sexual assertiveness (Carter et al., 2022). A study of high school girls in America reported that sexual communication is positively associated with social self-efficacy and sexual assertiveness (Brasilerio et al., 2023). Skakoon-Sparling and Cramer (2021) suggested that women may be less likely to initiate conversations about condom use when they are highly motivated to enter into a relationship. Similarly, Skakoon-Sparling and Cramer (2020) reported differences in how men and women negotiate the use of condoms and identified such strategies as a key

component in safe sex behaviour. Communications about condom use and contraceptive use is captured within the SCSE measure, as are communications about several other aspects of sexual behaviour. Perhaps the SCSE measure is too broad, and a more tailored measure targeting communications relating to a specific sexual behaviour would be more beneficial. Furthermore, SCSE targets sexual communication *self-efficacy*, perhaps it is this piece that is missing a relation to scores on the vignettes. A review of sexual self-efficacy among young men and women in Sub-Saharan Africa (Clossan et al., 2018), reported that only 25% of included intervention studies found a relationship between sexual self-efficacy and condom use, while most cross-sectional studies found a relationship between self-efficacy and condom use.

It is also important to note that the SCSE scale was amended slightly for use in this study, in that items concerning condom use were changed to enquire about protection instead. This change was made in order to make it relevant to individuals who may not use condoms. This may have diluted the potency of the questions, as such leading to a non-significant result. However, reliability analyses for the SCSE measure and each iteration of the vignettes did return a high Cronbach's alpha, indicating both the SCSE and vignettes were tapping into discrete and reliable constructs.

4.4.5 Potential Limitations

There are a number of limitations within this experiment that are important to take note of. Each of the ANOVA analyses investigating the impact of the priming conditions on sexual delay discounting, perception of STI risk, and scores on the vignettes restored a non-significant result. This may be a true non-significant result, or it may be as a result of some factors within the experiment. For example, the design of the experiment may have contributed to the non-significant results. The within-participants design of the experiment required participants to view each experimental condition. This meant that participants had

to view a fictional website with a fictional gossip article, which had the prime displayed on screen, before completing each outcome. Participants then had to repeat this procedure twice more, so as to be exposed to each priming condition. This may have become repetitive for some participants; a number of whom noted the experiment as such to the researcher. Participants may have become bored and distracted during the experiment, particularly during the sexual delay discounting task, which was by far the longest of the three measures. This is also evidenced through the number of participants who noticed the primes. While the majority of participants noticed the sexual prime, just over half noticed the general health prime, and approximately two thirds noticed the neutral prime. Just under half of the participants noticed each prime, meaning the remaining half either did not notice at least one prime, or wasn't sure. However, responding on the SDD task did indicate participants were engaged, as there were significant differences between the partner conditions. While the design of this experiment supported the novelty of the research and strengthened the validity of the findings, future research could focus on shortening procedures, or making them more variable so that participants maintain concentration throughout.

A research question included in this experiment consisted of comparing responses to primes across gender. This analysis was not possible in this experiment, due to uneven group sizes. As has been discussed at length in Chapter 2 of this thesis, men and women respond to sexual primes differently. In fact, the findings of the systematic review suggested that women aren't impacted by sexual primes, whereas sexual decision making of men is often very responsive to sexual primes. It is noteworthy that most of the participants in this study were women (65.2% of participants). This may provide an explanation for the non-impact of the sexual primes on sexual decision making, compared to both the general health prime and the neutral prime. Future research should aim to

recruit a more even spread of genders in order to investigate the efficacy of sexual health materials, and to identify differing responses across the genders.

4.5 Conclusion

This chapter builds upon work from previous chapters, by continuing to identify factors which impact upon sexual decision making. Sexual delay discounting and vignettes were used to quantify sexual decision making, based on findings as to their suitability from Chapter 2 and 3. Previous research has demonstrated the utility of sexual priming as an indicator of how sexual cues impact sexual decision making. This research extended this idea, in order to test the efficacy of sexual health promotional materials on sexual delay discounting, vignettes and the perception of STI risk. While these tests returned no significant findings, reasons as to what may have resulted in the non-significant results were explored. This exploration developed further insight into effective public health campaigns, and the purpose of such campaigns, with clear implications for future research.

Chapter 5.1 Introduction

Throughout this thesis, efforts have been made to pull together understandings from sexual health and sexual wellbeing, in order to garner a more complete understanding of sexual decision making. While previous chapters have explored indices of risk in the context of sexual decision making, this chapter adopts a broader exploration of sexual risk behaviour, sexual health, and factors relevant to sexual wellbeing, such as sexual attitudes, sexual communication self-efficacy and experiences of sexual education.

5.1.1 Importance of Sexual Wellbeing

As has been established in Chapter 1, there are distinct and meaningful differences between sexual health and sexual wellbeing. Distinguishing between these concepts is essential within sexual health policy (Mitchell et al., 2021). Mitchell and colleagues proposed that aspects of sexual health can include prevention and management of STIs, as well as management of sexual function and fertility regulation. Sexual wellbeing however, is a broader term that encompasses personal, interpersonal, and socio-cultural aspects (Lorimer et al., 2019). These can include sexual respect and self-esteem, self-determination over one's own sex life, and comfort within one's own sexuality (Mitchell et al., 2021). Public health approaches to sexual health have received criticism for its limited scope and focus on sexual risk, to the exclusion of other aspects of sexual wellbeing (Mitchell et al., 2021). Mitchell and colleagues also noted that public health interventions suffer as a result of the lack of delineation between these key terms. While STI prevention is of major concern from a public health perspective, it is not the only metric of sexual wellness. Sexual wellbeing is complex, and there are a multitude of factors, both intra and interpersonal, that impact upon the decisions that individuals make in sexual contexts.

Aspects of sexual wellbeing identified by Mitchell et al. (2021), such as sexual self-esteem and an autonomous and empowered sex life, do impact sexual health. For example, Chapter 2 identified that the combination of low mood and low self-esteem was associated

with reduced condom use intentions (MacDonald & Martineau, 2002). While research investigating the impact of sexual self-esteem on sexual risk has produced mixed findings, some research has indicated that adolescents with increased self-esteem have healthy sexual attitudes and positive attitudes towards condom use (Ahn & Yang, 2023). Other aspects of sexual wellbeing, such as sexual self-determination have also had reported impacts on sexual health; for example, a study conducted on married women in India reported that sexual autonomy was associated with a lower likelihood of reproductive tract infections, which may be reflective of increased agency among sexually autonomous women (Chandra & Paul, 2024). Similarly, Viswan et al. (2017) reported that partnered women higher in sexual autonomy were more likely to use modern forms of contraception, such as condoms and the oral pill.

Factors such as sexual communication and sexual self-efficacy, which fall under sexual wellbeing, have also had a reported impact on sexual health and risk behaviour. For example, an Australian study found that sexual self-efficacy was positively associated with increased risk with casual sexual partners, but not romantic (Seal et al., 1997). Sexual communication self-efficacy, defined as confidence in discussing sexual health, pleasure and limits, has also been identified as an important determinant of sexual behaviour (Quinn-Nilas et al., 2016). Sexual communication has been associated with indicators of risk reduction, such as use of condoms and contraceptives (Quinn-Nilas et al., 2016; Widman et al., 2006). Importantly, sexual communication has also been associated with other indicators of sexual wellbeing and health, such as sexual and relationship satisfaction (Roels & Janssen, 2020) and dimensions of sexual function (Mallory et al., 2019). Attitudes towards sexual behaviour have also been identified in previous research as being influential over sexual behaviour (Blanc et al., 2018), whereby people who have more positive attitudes towards sexuality are more likely to use birth control and engage in safer sexual behaviours (Sanders et al., 2006).

5.1.2 Knowledge of Sexually Transmitted Infections

Rates of STIs in Ireland increased rapidly between 2019-2023, with rates decreasing somewhat from 2023-2025 (HSPC, 2025). The Health Protection Surveillance Centre (HPSC) in Ireland also noted in 2023 that certain groups remain heavily affected by STIs, including people under the age of 25 and gay, bisexual and other men who have sex with men (gbMSM) (HPSC, 2024). Recent research indicates that there may be a lack of knowledge around STIs and their transmission among Irish youth, especially among particular groups. Research conducted by McConnell et al. (2021), reported that out of 1,840 participants, 9.1% of participants used coitus interruptus as a form of contraception. Of this cohort, 40.5% used it to protect against STI transmission. Similarly, of the 4.4% of participants who used emergency contraception, 59.3% of those used it to protect against STIs. While the percentage of participants who used these methods of contraception are fairly low compared to condoms (55.4%) or the contraceptive pill (39.6%), participants who did use coitus interruptus and emergency contraception may have been misinformed about the ability of these methods to protect against STI transmission. Similarly, the Economic and Social Research Institute (ESRI) reported that, in Ireland, sexual health literacy is slightly higher amongst those from more economically advantaged backgrounds, and that sexual health literacy is significantly related to vocabulary skills at primary school (ages 4-12) and Leaving Certificate (17/18 years of age) level (Nolan & Smyth, 2025). It is also noteworthy that in their report, Nolan and Smyth reported that 80% of men and women over the age of 20 correctly identified condoms as the best method for STI protection. This indicates that there is a level of knowledge of STIs and their transmission amongst young Irish people.

5.1.2.1 Impact of Knowledge on Sexual Risk Behaviour

Research indicating insufficient STI knowledge amongst Irish youth is further supported by high rates of STIs among 20-24 year-olds (HSPC, 2025). Research conducted in Italy has reflected similar shortcomings in protective sexual health behaviours and knowledge amongst young people. In 2015 it was reported that 19.5% of all new cases of STIs were diagnosed in individuals aged 15-24 (Drago et al., 2016). In the same piece of research, it was reported that only 0.5% of teenagers surveyed recognised all STIs from a list of infections, and only 22% correctly identified that abstinence and condoms are the only methods for preventing STIs (Drago et al., 2016). A similar misunderstanding of STIs was demonstrated in a Romanian sample of young people. Awareness of some risks was reasonably good, for example 98.5% correctly identified STIs can be transmitted through vaginal sex, 79.1% identified anal sex, and 76.5% identified oral sex (Grad et al., 2018). However, 19.9% believed that STIs could be transmitted through kissing on the mouth, and 27.9% believed STIs could be transmitted via toilet bowl seats. The majority knew that HIV, chlamydia, and gonorrhoea are sexually transmitted, however roughly one third correctly identified trichomoniasis, Hepatitis B and C as STIs. Also of note was that despite relatively good awareness of the risks of unprotected vaginal, anal, and oral sex, 23.4% never used a condom during vaginal intercourse, 58.4% never used a condom during anal intercourse, and 90% never used a condom during oral intercourse. These results highlight a disparity between knowledge and behaviour, such that knowledge that a behaviour may expose the individual to risk, does not necessarily indicate that that behaviour will be avoided.

As such, it is important to note that while knowledge is important in understanding sexual risk taking, it alone is not sufficient to understand this process; it has been noted that increased knowledge doesn't necessarily lead to a reduction in risky sexual behaviour (Graf & Patrick, 2015). This is also true of risky behaviour in other domains; in fact, some

research has identified that increased health knowledge was associated with increased risk behaviour (Alves, 2024). It has been noted that while there is a link between sexual knowledge and decision making, this relationship is not always direct or linear. Therefore, including attitudes and self-efficacy may help further illuminate the relationship.

5.1.2.2 Measuring STI Knowledge

The lack of standardised measures for quantifying levels of STI knowledge makes comparison across populations difficult. Papers often report descriptive statistics from individual questions within a measure, such as in Drago et al. (2016) and Grad et al. (2018), rather than reporting an average composite score. As such, it is difficult to ascertain what is an acceptable level of knowledge of STIs within a particular population. Some research has been conducted in this area; for example, a study published on Turkish youth reported average STD knowledge scores of 44.65% (Voyiatzaki et al., 2021). Another study of US medical students reported average sexual knowledge of 66% (Warner et al., 2018). However, different STI knowledge measures are used across these papers, highlighting the need within the literature for a standardised measure of STI knowledge.

5.1.2.3 Importance of Physical Barriers in Reducing STI Transmission

An essential component of STI knowledge is knowing how they are transmitted, and how one can be protected from them. The most common means of STI protection are through the use of physical barriers, such as condoms or dental dams. There is a lack of awareness and discussion of dental dams in the literature on STI knowledge and sexual risk behaviours, particularly in discussions around physical barriers (Gil-Llario et al., 2021). Dental dams are encouraged by public health interventions for prevention of transmission of STIs, particularly in the context of oral sex, however their utility often goes unacknowledged in the literature on STI awareness (Gutierrez et al., 2022). Dental dams are also often encouraged specifically within lesbian and WSW populations (Gil-Llario et

al., 2021). Despite the utility and efficacy of dental dams within a multitude of populations as a physical barrier for the prevention of STIs their use often goes unacknowledged, within the research literature, health promotion material and in sexual education (Gil-Llario et al., 2021). This point has also been supported by Gutierrez et al. (2022), who recommend increased awareness of dental dams, due to their efficacy in reducing STI transmission via oral sexual contact. Similarly, PEP and PrEP, which have emerged in recent years as extremely effective treatment and protective medications for HIV, have limited awareness among key populations (Simões et al. 2021). However, this may be due in part to two factors; firstly, PEP and PrEP are not readily available in every country (ECDC, 2024), and secondly, these means of protection from HIV transmission have only been recently discovered and popularised. This also highlights the lack of inclusion of LGBTQ+ participants in research studies on sexual health and wellbeing.

5.1.3 Sexual Education and Sexual Health Policy

In order to improve knowledge of STIs and other outcomes of risky sexual behaviour, it is critical to understand what is influencing the lack of knowledge. One potential explanation for the limited STI knowledge of young people in Ireland could be due issues within sexual education. In a review of the Research and Sexual Education (RSE) programme conducted by the National Council for Curriculum and Assessment (NCCA), it was reported by past and present students that not all topics that are included within the programme were covered (NCCA, 2019). Students commented that they felt teachers responsible for their sexual education cherry picked the topics they felt most comfortable discussing. Interestingly, a topic that students often reported being covered, at least partially, was the risks of sexual behaviour, including the transmission of infection. It was reported in the review that RSE can be taught using a ‘risk and danger’ approach, whereby the risks of STIs are highlighted to students. Students reported a desire to learn

about additional skills that are required to navigate consensual and respectful relationships (NCCA, 2019). The NCCA report also highlighted other gaps in the RSE programme, such as issues pertaining to LGBTQ+ people, the proliferation of pornography, consent and the effects of social media and the internet on relationships and self-esteem. Furthermore, of the students that participated in the focus groups, all but one school was reported as promoting either an abstinence or problem-based approach to RSE. These approaches focus on the risks and dangers of sexual activity and tend to neglect the positive aspects of sexuality and sexual wellbeing. This was identified by students as being unhelpful and out of touch with experiences in their lives.

A similar assessment of sexual education can be found across Europe; a survey of young people in Italy reported that 36% of participants rated their experience of sexual education as poor, while 23% reported it as completely non-existent (Drago et al., 2016). A study of Spanish and Portuguese students reported that just under a third of participants did not receive sexual education from a formal source, whereas nearly all participants received sexual education from an informal source, such as media, romantic partners or parents (Rodrigues et al., 2024). This paper also reported that those who were more influenced by formal sexual education sources were more focused on disease prevention, enacted more sexual health communication and condom use, but had less sex positive attitudes, compared to those who reported greater influence from informal sources. The authors also report that such lower attitudes may reflect a programme of sexual education that is not fit for the needs of adolescents and is exclusively focused on disease prevention.

In Ireland, The National Sexual Health Strategy 2015-2020 was launched in 2015, in order to address sexual health and wellbeing at a national level. Prior to this strategy, there had not been a coordinated approach across regions. The aims of this strategy were to ensure everyone has access to a sexual health education and information, and to ensure the existence of an accessible, high quality health service. Another key goal of this strategy

was to ensure the availability of high-quality evidence to guide the service. A review of this strategy was conducted by Crowe (2023). The review underscores the importance of a salutogenic approach to sexual health and wellbeing, specifically in relation to the Sexual Health and Crisis Pregnancy Programme, whereby the focus is on factors that bolster health and wellbeing, rather than focusing on an avoidance of risk or disease. The report noted the considerable progress that was made in the implementation of the national strategy, but also concluded that a future national health strategy for sexual health requires a Model of Care that is developed from a strong evidence base.

When looking at the intersection between sexual education and sexual wellbeing, it becomes apparent that it is important to understand factors like sexual attitudes and sexual self-efficacy for their own sake. While previous chapters have explored sexual decision making as an outcome, it is important to note that it is not the only important outcome of a programme of sexual education. This has been further supported by the feedback from students in the NCCA review of RSE, with many students commenting on the lack of discussion around the emotional and social components of sexual behaviour (NCCA, 2019). Ultimately, individuals can make decisions that could be interpreted as risky from a public health perspective, despite the fact that the decision being made is fully autonomous and makes sense to the person within the context of their lives. Provided that there exists a robust sexual education and public sexual health policy in order to ensure that people can make informed and autonomous choices, there is nothing additional that can be done to ensure that every choice that's made is risk-less per se. As stated by Nolan and Smyth (2025), while certain sexual behaviours undeniably, such as unsafe sex, involve a level of risk, normative judgements within a society label certain behaviours as problematic. Ensuring that individuals have the skills and knowledge to have a healthy sexuality, which comprises physical, mental, and emotional facets merits encouragement and exploration. Furthermore, ensuring that a person’s behaviour is aligned with their values and

contributes something positive and meaningful to their lives warrants encouragement from public health. This viewpoint is vital both within sexual education and sexual health, as supported by comprehensive sexuality education, which is Ireland's chosen model of sexual education (*Ireland | Comprehensive Sexuality Education | Education Profiles*, n.d.).

5.1.4 Missing LGBTQ+ Perspective

It has been noted in previous literature that LGBTQ+ perspectives are often missing from research on sexual behaviour, and that the factors impacting such individuals in this domain may be distinct from that of their heterosexual and cisgender counterparts. For example, previous research has already outlined LGBTQ+ individuals typically receive little to no sexual education that's tailored to them (Burton & Avilla, 2021) and face specific risks with regard to STI transmission and sexual attitudes (Kaestle & Allen, 2011). It has been reported that LGBT youth are often forced to depend on non-traditional and unreliable sources to learn about LGBT sexual issues, which can impact their sexual education and development of sexual and attitudes and beliefs (Burton & Avilla, 2021). Burton and Avilla concluded that sexual education sources available to LGBT youth ultimately did more harm than good, and that there is a need for more LGBTQ+ related content within traditional sexual education. Therefore, it is a key aim of this research to include sexual and gender minorities in order to extend our understanding of sexual behaviour.

5.1.5 The Current Research

The study detailed in this chapter explores the relationship between experiences of sexual education, sexual attitudes, sexual communication self-efficacy and knowledge of sexually transmitted infections (STIs), and sexual risk taking. This study also explored the

interplay between these variables in order to uncover more about the relationships between sexual education, knowledge, attitudes and behaviour.

The specific aims of this piece of research are as follows:

1. Evaluate participants' experience of the sexual education they received as adolescents (RQ1)
2. What is the current level of understanding among young Irish people about STI symptoms, transmission, and treatment? (RQ2)
3. Do sexual knowledge, sexual attitudes and sexual self-efficacy vary across sexual orientation and gender identity? (RQ3)
4. What factors predict self-reported risky sexual behaviour (RQ4)
    a. factors include sexual attitudes, sexual knowledge, sexual self-efficacy, sexual education, and demographic factors (sexual orientation and gender identity)
5. Do sexual attitudes and sexual communication self-efficacy mediate the relationship between STI knowledge and sexual risk behaviour? (RQ5)

5.2 Methodology

5.2.1 Design

This study took the form of an online cross-sectional survey, which measured sexual attitudes, sexual risk behaviour, sexual communication self-efficacy, STI knowledge and experiences of sexual education.

5.2.2 Materials and Settings

It's important to note that the measures for STI knowledge and sexual education for the project were designed with input from the HSE's Sexual Health and Crisis Pregnancy

Programme (SHCPP). This was in order to ensure the questions' relevance to an Irish population. The materials for this study can be found in Appendix O. More detail on each measure is provided below.

5.2.2.1 Brief Sexual Attitudes Scale (BSAS)

The materials required for this study include the Brief Sexual Attitudes Scale (BSAS), which is a 23-item condensed version of a sexual attitudes questionnaire (Hendrick et al., 2006). The items are rated on a five-point Likert scale ranging from *strongly agree* to *strongly disagree*, meaning that lower results indicate greater affiliation with that attitude. There are four subscales in this measure, with each subscale referring to a different aspect of sexuality: 1) Permissiveness, referring to a casual sexuality, 2) Protection, referring to a responsible and tolerant sexuality, 3) Communion, referring to an idealistic sexuality whereby sex is seen as the ultimate form of human connection, and 4) Instrumentality, the view that sex has a physical and biological utility. In the original version of BSAS, the second subscale is reported as Birth Control, and questions ask participants about their opinions relating to men and women's responsibility towards birth control. These questions were altered slightly for the purpose of this study, in order to include participants who may not have the use for birth control. As such, these questions were amended to focus on protection. The name of the subscale in this study was also changed to Protection. The measure has scored well in test-retest correlations, and each of the four subscales have high reliability scores (Hendrick et al., 2006).

5.2.2.2 The Sexual Communication Self-Efficacy Scale

The Sexual Communication Self-Efficacy Scale (Quinn-Nilas et al., 2016) was used to measure sexual self-efficacy. This is a 20 item scale, where participants indicate how easy they find it to discuss certain topics with sexual partners.

5.2.2.3 STI Knowledge and Sexual Education (Drago et al., 2016; Grad et al., 2018)

The scale being used to measure STI Knowledge and Sexual Education is an amalgamation of two scales by Drago et al. (2016) and Grad et al. (2018). There are 25 items; the first section, comprising 10 items, asks about participants' sexual education, and about how well equipped they felt to navigate sexual scenarios as an adolescent versus their current age. The second section, comprising 15 items, has a range of questions about the symptoms, transmission, and treatment of sexually transmitted infections.

5.2.2.4 Sexual Risk Survey

The Sexual Risk Survey (SRS; Turchik & Garske, 2009) was used to measure risky sexual behaviour. The SRS is a 23-item questionnaire designed to assess the frequency of sexual risk behaviours over the past 6 months in college students. The SRS includes five subscales: sexual risk taking with uncommitted partners, risky sex acts, impulsive sexual behaviour, intent to engage in risky sexual behaviours, and risky anal sex acts.

5.2.3 Participants

There were 280 participants that took part in this study. As a result of incomplete data, 11 responses were removed, leaving 269 participants. The average age of participants was 24.03 years (SD = 3.28; range 18-30). For 91.1% of the population, English was their first language. There were 87% of participants living in Ireland, with 74.7% of participants being born in Ireland. The majority of participants were women, heterosexual, White Irish, and single (never married). The most common education level was undergraduate degree (33.8%). Of those living in Ireland, the highest percentage lived in Dublin (46.1%). See Table 5.1, and Figures 5.1 and 5.2 for a full breakdown of participant characteristics. Of the three that chose ‘Other’ for gender, one participant identified as female, one as queer, and one as questioning/nonbinary. Of the four that chose ‘Other’ for sexual orientation,

one indicated they were bicurious, one participant identified themselves as ‘Straight’, and the third participant identified as ‘Bisexual and demisexual’, and another as ‘A-spec Pan’. ‘A-spec’ is an umbrella term for orientations that belong under the aromatic or asexual spectrum, and ‘Pan’ refers to pansexuality, (UC Asexual/Aromantic Glossary, n.d.). See also Figures 5.3 and 5.4 for information on the marital and relationship status of participants. See Appendix P for a breakdown of accommodation status of participants.

Participants were recruited online and in person. Social media posts were shared by the researcher on X, Instagram, and LinkedIn, which had information about the study and how to get involved. Recruitment posters were hung up on DCU campus, an example of which can be found in the Appendix Q. The researcher also attended DCU Student Union events relating to sexual health to promote participation in this study. As it was an aim for this project to capture the efficacy of sexual education and knowledge across young people, it was important that the sample size was large. Given the issues with recruitment in the previous study, this study had a very clearly defined recruitment strategy. As such, contacts in the HSE, Union of Students Ireland (USI) and HEA Healthy Living programme were leveraged to share this project on their platforms, in order to reach as many people as possible. As it was also a key aim to ensure LGBTQ+ perspectives are included in the research, charities and organisations concerned with the welfare of queer individuals were contacted and asked to share the research.

Figure 5.1

Pie-chart of percentage of participant gender identity

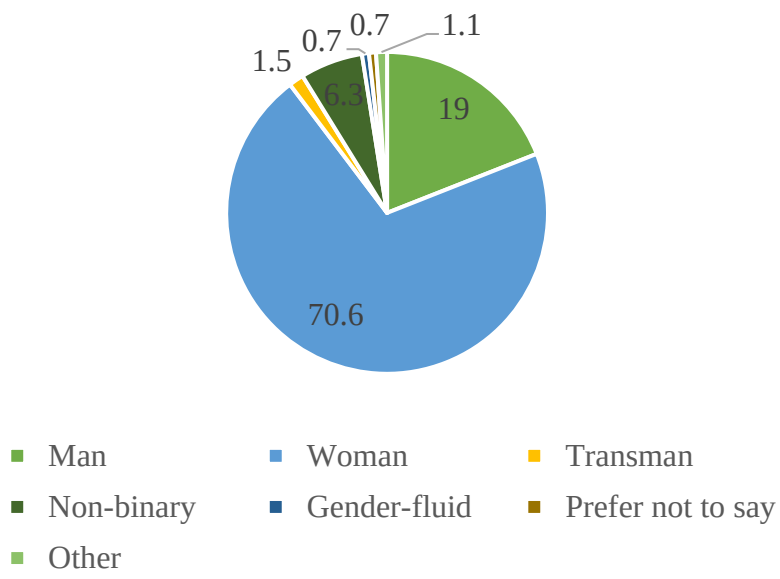


Figure 5.2

Pie-chart of percentage of participant sexual orientation

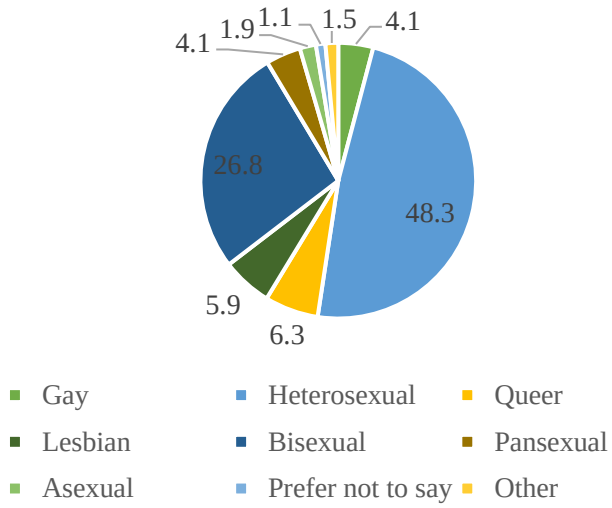


Figure 5.3

Pie-chart of percentage of participant religious affiliation

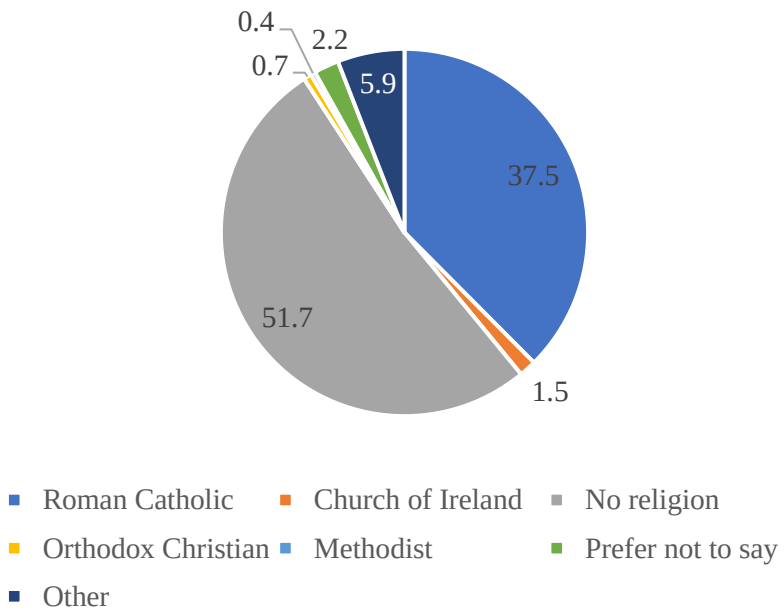


Table 5.1

Participant characteristics

Characteristic	***(n)***	***(%)***	***M***	***SD***
Age (years)	269		24.03	3.28
Ethnicity				
White Irish	210	78.1		
Other White	33	12.3		
White Irish & Other	2	.7		
White Irish & Other White	3	1.1		
Black Irish	2	.7		
Black African	1	.4		
Black Irish & Black African	1	.4		

Other Black	1	.4
Asian Irish	5	1.9
Chinese	3	1.1
Indian/Pakistani/Bangladeshi	2	.7
Asian Other	1	.4
Prefer not to say	2	.7
Other	3	1.1
Level of Education		
Junior Certificate	4	1.5
Leaving Certificate	66	24.5
PLC Course	9	3.3
Undergraduate Degree	91	33.8
Master's Degree	80	29.7
Doctorate/Postgraduate Degree	13	4.8
Post Doctorate	1	.4
Other	5	1.9

Figure 5.4

Marriage status of participants

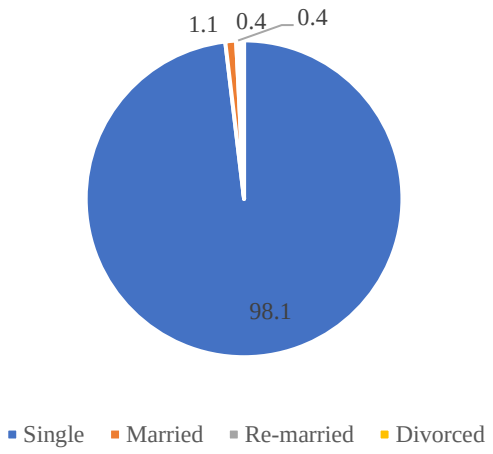
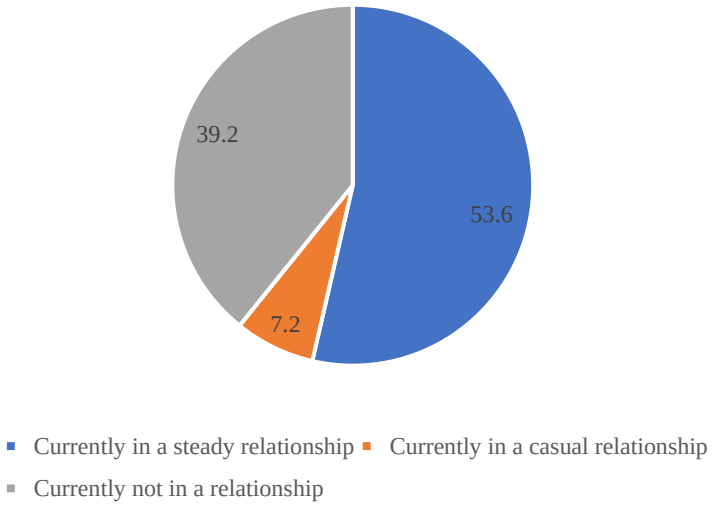


Figure 5.5

Relationship status of single participants



5.2.4 Procedure

Participants took part in the study online, via Qualtrics. Participants received the link to the study by following the QR code on the poster, or by following a link on a social media post. Participants could complete the survey wherever they wished, however they were asked to complete it in an environment with no distractions. Participants were firstly presented with a Plain Language Statement and a Consent form, in which they were required to have answered every question to proceed with the study. Participants were also asked to voluntarily provide information such as their age, gender identity, sexual orientation and level of education. Participants were able to complete the study either on their phones or on their laptop. Participants then completed the questionnaires. Presentation of the scales was counterbalanced.

Following completion of the study, participants were provided with a Debriefing form, which reiterated to them the purpose of the study, and the contact details for the research team, as well the contact details for DCU Counselling services, Samaritans, and sexual health resources, if they needed them.

5.2.5 Ethics

Ethical approval was granted to this study by REC. The letter of approval can be found in Appendix R. This study did not collect personal data from participants. However, there were still some ethical concerns in the study, which will be explored below.

5.2.5.1 Data Withdrawal

This survey did not collect personal data, that is, no identifying information was collected from participants. All responses to this survey were completely anonymous. Therefore, if participants wished to withdraw their data after submitting their responses on the online platform Qualtrics, there was no way to identify their data in order to withdraw it. Participants could only withdraw their data, up until they submitted their data at the end of the survey. After this point there was no way to distinguish their data from anyone else's. Anybody who did not complete the survey was therefore deemed to have withdrawn from the study and their data were removed. This information was included in the PLS and Debriefing form, and participants had to specifically state they understood they could only withdraw their responses up until final data submission at the end of the survey.

5.2.5.2 Subject Matter of Study

The measures used in this study directly asked participants questions about their attitudes, knowledge, behaviours, and experiences of education, both in formal settings and in informal settings, such as with parents or guardians. Some of these measures included questions about alcohol and drug use as they pertained to sexual behaviour, and some

aspects of sexual behaviour which may have felt particularly invasive or embarrassing to some participants, such as sexual encounters that participants regretted. It was made clear to participants, through the Plain Language Statement, the Consent form, and the Debriefing form, that their participation was voluntary, and that if they wished to withdraw their consent to partake in the study, they could do so up until they submitted their response.

5.2.6 Data Analysis

Preliminary analysis, consisting of tests of normality, linearity, multicollinearity, and homoscedasticity were conducted on SPSS. Data cleaning and coding was conducted on Qualtrics, Microsoft Excel and SPSS. Descriptive statistics were conducted on SPSS.

5.2.6.1 Multiple Regression Analysis

A multiple regression was conducted on the data, in line with research question 4. The purpose of this analysis was to identify predictive factors of sexual risk. This analysis was conducted on SPSS.

5.2.6.2 Mediation Analysis

A mediation analysis was conducted, in order to identify if sexual communication self-efficacy and sexual attitudes can provide further insight into the relationship between STI Knowledge and sexual risk. This analysis aligns with the fifth research question of this chapter. In order to further investigate the relationship between knowledge and behaviour in this study, mediating factors are being investigated to identify if there are alternative pathways through which STI Knowledge impacts sexual risk behaviour. As such, SCSE

and the four subscales of sexual attitudes are included as mediators in this model, to explore the impact of STI Knowledge on sexual risk through alternate pathways.

Previous approaches to mediation have argued that in order to run the analysis, the predictor variable must significantly predict the outcome variables (Baron & Kenny, 1986). More recent approaches, such as that taken by Field (2018), argue in favour of the use of mediation for identifying mediating variables that change the nature of the direct relationship between a predictor and outcome variable. As such, in line with the research question outlined previously, SCSE and sexual attitudes were included as mediators in this model. This analysis was completed on SPSS.

5.2.6.3 Moderation Analysis

Four moderation analyses were conducted in order to investigate if sexual and gender minority status moderated the relationship between the predictors in the multiple regression and self-reported sexual risk. These variables were entered as dummy coded variables as before, in order to retain power. This method of analysis was chosen, as more nuanced analysis was not feasible due to low numbers of participants across subgroups. A separate moderation analysis was conducted for each predictor variable, in order to prevent SPSS weighting the first predictor variable entered into the model. As this produces 6 separate moderation analyses, a Bonferroni adjustment [1]was applied to the *p* value in order to reduce the likelihood of a Type 1 error. As such, a significant *p*-value was taken as .0083 or less.

5.2.6.4 Dummy Coding Sexual and Gender Minority Status

Similarly to what occurred in Chapter 3, the planned analysis of the nature of sexual risk amongst sexual and gender minorities was not possible due to low participant

[1] .05 ÷ 6 = .0083

numbers across subgroups of sexual and gender minorities. However, unlike Chapter 3, there was some more variation in participants in this study. This facilitated the computation of two new variables: sexual minority status (SMS) and gender minority status (GMS). SMS was computed such that the levels represented Sexual Minority vs Heterosexual (reference group). GMS was computed similarly, such that the levels represented Gender Minority vs Cisgender (reference group). Computing these variables facilitated further analysis and allowed a distinction to be made between sexual and gender minorities.

5.3 Results

5.3.1 Data Cleaning and Scoring

5.3.1.1 Sexual Risk Survey

There were 280 participants that took part in this study. Following removal of incomplete responses, 269 responses were retained for the further analysis. Prior to analysis, missing data were analysed. Four participants (1.4% of the sample) did not provide any SRS data and were removed from analysis. A high volume of participants responded to this measure with text, despite instructions asking them to provide numerical figures. Numerical data points were extracted from the text responses given. After this, 0.8% of the remaining data was still missing. A Little MCAR test produced a non-significant result, indicating the data were missing at random. As such, a Multiple Imputation (MI) was conducted on the data, as per Tabachnick and Fidell (2021). Turchik et al. (2015) also used a procedure similar to MI to replace their missing data on the SRS.

As part of the MI procedure, SPSS was instructed to produce 5 new imputations of the dataset. This number was selected as the percentage of missing data was relatively low. A number of auxiliary variables were included as part of the MI to improve accuracy of the SPSS-imputed values, including demographic variables, such as age, sexual orientation,

gender identity, religion, and education level. Other variables related to sexual behaviour were also included, such as age of sexual debut, the composite STI Knowledge score, the scores from the BSAS subscales, and the SCSE total scores.

Following the MI, the results for each of the 23 items were recoded. Scores of 0 were given to participants who had provided a frequency of 0. All other frequencies were recoded into an ordinal variable with 4 levels. As per the procedure laid out by Turchik and Garske (2010), and because the data was positively skewed, the frequencies were recoded approximately as follows: 40% of responses = 1, 30% of responses = 2, 20% of responses = 3, 10% of responses = 4. However, due to the distribution of each individual variable, these percentages varied. For example, on item 1 (How many partners have you engaged in sexual behaviour with but not had sex with?), 1 = 50.57% of responses, 2 = 31.62% of responses, 3 = 14.02% of responses, 4 = 3.7% of responses. Full details of how each item's responses were recategorised can be found in Appendix S. Due to the high variance within the SRS data (minimum value = 0, maximum value = 700), the MI produced a small number of negative values. For the recoded ordinal variable, these were recoded as 0 (participants cannot score lower than 0 on this measure).

After recoding, the data were still positively skewed. A boxplot indicated data may not be normally distributed, with several outliers, and the Q-Q plot displayed a slight nonlinearity within the data. In order to correct this, a square root transformation was performed on the data. This greatly improved the normality and linearity within this variable. As such, this transformation was used in the inferential statistics to come.

5.3.1.2 STI Knowledge Questionnaire

There were 15 items in the STI Knowledge Questionnaire. The STI questionnaire did include a question asking if participants would know if they had an STI. However, this question was not included in the overall knowledge score calculation; many participants

correctly identified that STIs can be asymptomatic, and as such they may have one and not know. Therefore, the remaining 14 questions were included in the STI Knowledge scale. For questions which provided a range of answers from which participants had to pick a number of correct answers (for example, Question 1: Which of the following are sexually transmitted infections?), participants were given a point for every correct response. Correct responses included both ticking correct answers and leaving incorrect answers unticked. These points were then added up, divided by the number of responses, and presented as a percentage. These percentages were then added across the 14 questions and divided by 14 in order to calculate the percentage of correct answers across all questions. For questions that had dichotomous responses, participants could score either 100% or 0%. For a number of questions, participants could answer 'Yes', 'No', or 'I don't know'. For these questions, 'I don't know' was also treated as an incorrect answer. Similarly, for a number of questions with several potential answers, participants could answer 'All of the above' or 'None of the above'. In every question where these responses were available, both of these responses were incorrect. If participants chose either of these responses, they were given a score of 0%.

5.3.1.3 Sexual Communication Self-Efficacy

There were 20 items in the Sexual Communication Self-Efficacy Scale. This measure was scored from 1 (very difficult) to 4 (Very easy), such that higher scores indicated greater communication self-efficacy.

5.3.1.4 Sexual Attitudes

The Brief Sexual Attitudes Scale is a 23-item scale with 4 subscales (Permissiveness, Protection, Communion, and Instrumentality). This measure was scored from 1 (strongly agree) to 5 (strongly disagree), meaning that lower scores indicate greater affiliation with that attitude.

5.3.2 Evaluation of Participants' Experience of Sexual Education (RQ1)

5.3.2.1 Sexual Education Descriptive Statistics

Self-reported mean age of receipt of RSE in primary/secondary school was 11.5 (range 0-17). 33.46% of participants had not discussed sex or relationships with their parents. Of the 66.54% that did discuss sex/relationships with their parents, participants were a mean age of 13.67 years (range 4-29) when they first had a conversation with parents/guardians about sex or relationships. This indicates most participants had received some degree of sexual education in formal education by the time they discussed sex or relationships with their parents. Most participants (90.4%) reported that they felt most comfortable having conversations around sex/relationships with their mother or mother figure. Just under a third reported that they found it 'Quite difficult' to talk openly about sex with their mother/mother figure. See Figures 5.5 and 5.6 for a full breakdown of answers. Of note, 1.7% reported that sex never came up as a topic of conversation with their mother/mother figure, compared to 31.8% for father/father figures.

When asked to indicate the quality of sexual education they received in school, 78.8% of participants rated their education as 'Insufficient'. 4.8% reportedly did not receive formal sexual education at all (n = 13), and 16.4% rated their education as 'Sufficient'.

Nearly 5% (4.8%) of participants reported they had never engaged in sexual activity, and 1.5% preferred not to say. Of the 93.7% that had engaged in sexual activity, the mean age of first sexual intercourse was 17.41 (range 12-27).

Figure 5.6

Pie chart of percentage responses to the question 'How easy/difficult was it to talk openly about sex with your mother/mother figure?'

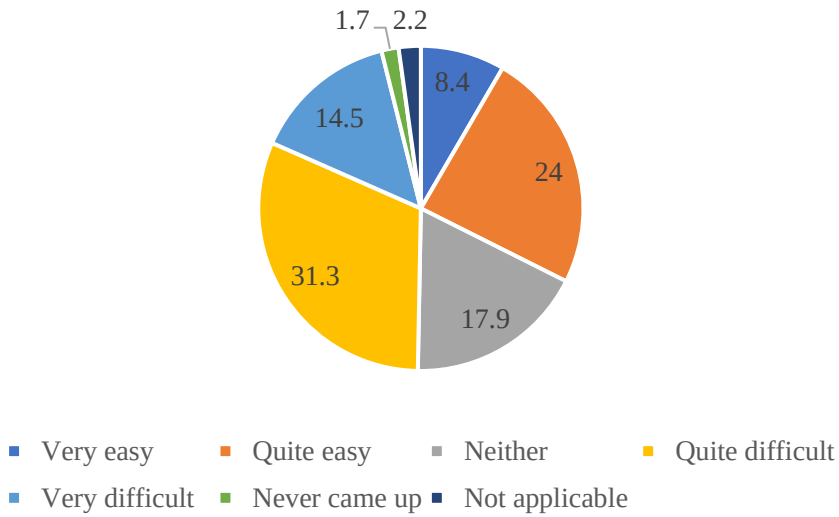


Figure 5.7

Pie chart of percentage responses to the question 'How easy/difficult was it to talk openly about sex with your father/father figure?'

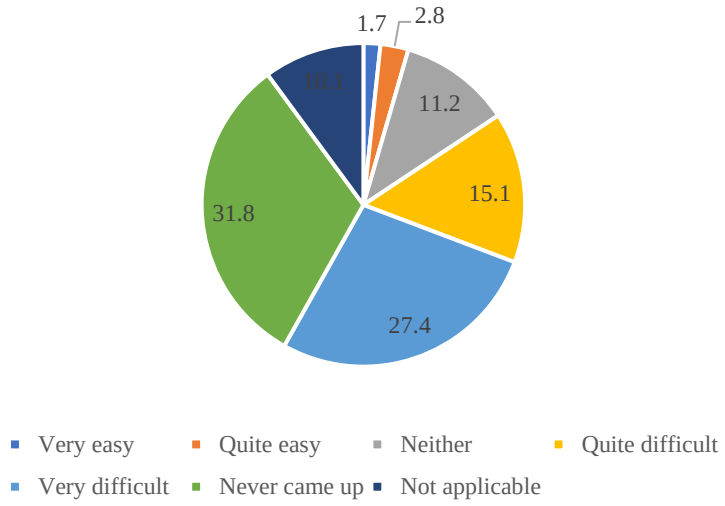


Table 5.2

Breakdown to 'How easy or difficult was it to talk openly about sex with your mother/mother figure?' by gender.

Gender Identity	*n*	Very easy	Quite easy	Neither	Quite difficult	Very difficult	Never came up
Man	31	9.7	19.4	22.6	22.6	19.4	3.2
Woman	129	9.3	24	17.1	34.1	12.4	1.6
Transman	1	100	0	0	0	0	0
Non-binary	12	0	3.9	16.7	16.7	25	0
Gender-fluid	2	0	50	0	0	50	0
Prefer not to say	1	0	100	0	0	0	0
Other	3	0	0	33.3	66.7	0	0

Table 5.3

Breakdown to 'How easy or difficult was it to talk openly about sex with your father/father figure?' by gender.

Gender Identity	*n*	Very easy	Quite easy	Neither	Quite difficult	Very difficult	Never came up	Not applicable
Man	31	3.2	6.5	12.9	25.8	16.1	25.8	9.7
Woman	129	1.6	1.6	10.1	12.4	31.8	33.3	9.3
Transman	1	0	0	0	100	0	0	0

Non-binary	12	0	8.3	8.3	8.3	16.7	50	8.3
Gender-fluid	2	0	0	0	50	0	0	50
Prefer not to say	1	0	0	100	0	0	0	0
Other	3	0	0	33.3	0	33.3	0	33.3

5.3.3 Current Level of Understanding Amongst Young Irish People of STI Symptoms, Transmission and Treatment (RQ2)

5.3.3.1 STI Knowledge Descriptive Statistics

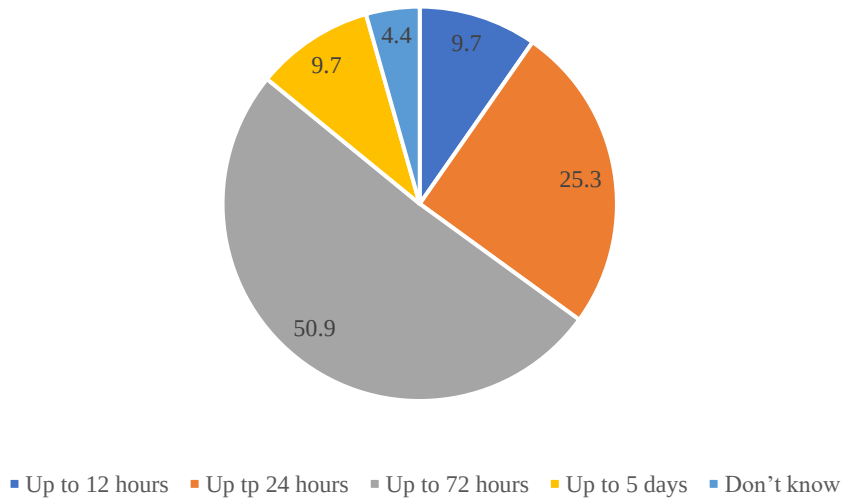
The mean score for STI knowledge was 63.87 (SD = 16.07; range 26.95 - 96.15). 34.2% of participants reported that they would know if they had an STI. 35.7% participants chose ‘I don’t know’, and when asked to provide an explanation for their answer, many reported that STIs can be asymptomatic.

The majority of participants correctly identified that a person can get an STI the first time they have sex (98.5%). Most also reported they knew what a smear test was (89.2%), and of that cohort, 75.1% correctly identified that a smear test does not assure a person that they have not contracted an STI. Almost exactly three-quarters of participants did not know what U=U meant (75.8%), and only 52.8% of participants reported that the knew what PEP and PrEP were. Of those that reported knowing what PEP and PrEP were, 98.6% correctly identified that PEP and PrEP protects against HIV transmission, which translates to 52.1% of the entire sample.

When asked how long after sexual intercourse can emergency contraception effectively be used, 9.7% answered correctly (Up to 5 days). See Table 5.4 for a full breakdown of answers.

Figure 5.8

Participant responses to 'How long after sexual intercourse do you think the 'morning after pill' or 'emergency contraceptive pill' can be effectively used?'



When asked to choose from a list of STIs and other infections and identify which of the infections caused cancer, participants got a mean score of 77.94% correct answers (SD = 17.05). 21.2% of participants did not know that HPV caused cancer, and 68% of that cohort were women. However, of the women over the age of 25, 92% knew that HPV could cause cancer. 100% of men aged 18-20 knew that HPV causes cancer, compared to 64.9% of women. When asked to indicate the STIs from a list of infections, participants received a mean score of 77.94% (SD = 17.05). 62.1% correctly identified that there is a vaccine that can protect against some types of STIs, with 12.3% of that cohort correctly identifying that there are vaccines that protect against HPV and HBV. When asked which forms of contraception can offer protection from STIs, participants got a mean score of

89.25 (SD = 18.86). A breakdown of mean scores across each question in the STI Knowledge Questionnaire can be seen in Table 5.4.

Table 5.4.

Mean scores and standard deviations for each question on the STI Knowledge Questionnaire.

Question	Mean % Score	SD	Range	% Participants performing above chance Level	% participants answered correctly
Which of the following are sexually transmitted infections?	77.94	17.05	0-100%	97	
STIs can be transmitted through…	85.35	15.69	0-100%	97.4	
Which means of contraception protect against STIs?	89.25	18.86	0-100%	96.3	
Symptoms can present with the following Symptoms	61.3	35.58	0-100%	74	
Which of the following	71.86	9.51	36.36-100%	97.8	

STIs can potentially cause cancer?					
What kind of vaccine exists?	44.92	43.45	0-100%	51.7	
How long after sexual intercourse do you think the 'morning after pill' or 'emergency contraceptive pill' can be effectively used?					9.7%
Is there a vaccine that can protect against STIs?					62.1
Can a person get an STI the first time they have sex?					98.5
Do you know what a smear test is?					89.2

Does a negative smear test assure a person that they have not contracted any sexually transmitted infections?	75.1
Do you know what U=U means?	24.2
Do you know what PEP and PrEP are?	52.8
What do PEP and PrEP protect against?	98.6

Note. The range of values for these questions was also provided, as well as the percentage of participants performing above chance. For questions with dichotomous answers, the percentage of correct answers were provided

5.3.3.2 Relationship Between STI Knowledge and Sexual Education

A linear regression was conducted in order to explore whether self-reported quality of sexual education had an impact on STI Knowledge. Quality of sexual education was dummy coded into two variables, with 'No Sexual Education' as the reference category in both variables. In the first variable, insufficient was coded as 1, with 'Sufficient' and 'No Sexual Education' coded as 0. In the second variable, 'Sufficient' was coded as 1, and 'Insufficient' and 'No Sexual Education' was coded as 0. Both of these variables were entered into the regression, with STI Knowledge as the outcome variable. The regression was significant {$F(2, 266) = 3.63$, $p < .05$}, with the Insufficient variable displaying a significant result ($p < .05$). This variable achieved a beta value of .25 ($t = 2.2$). The Sufficient variable did not reveal any significant difference. These results indicate that those that reported their sexual education as insufficient had slightly, but significantly higher results on the STI Knowledge measure than those who indicated their education was sufficient, and those who reportedly did not receive sexual education at all.

A correlation analysis was conducted in order to reveal the association between age of sexual debut and STI Knowledge. A weak ($r = .064$) but significant relationship between age of sexual debut and STI Knowledge was revealed. Similarly, a very significant ($p < .001$) yet weak ($r = -.24$) negative relationship was revealed between age of sexual debut and the sexual risk measure. This result indicates that as the age of sexual debut decreases, self-reported sexual risk increases.

See Appendix T for additional analysis pertaining to sexual education, sexual risk, and social media.

5.3.4. Factors Which Predict Risky Sexual Behaviour (RQ4)

5.3.4.1 Tests of Normality, Linearity, Homoscedasticity and Reliability Analysis

Assumptions of linearity and homoscedasticity were conducted on the continuous predictor variables included in the regression analysis; namely SCSE, subscales of the BSAS (n=4), and STI composite scores. Means and 5% trimmed means, Kolmogorov-Smirnov tests, histograms, Q-Q plots, and scatter plot were consulted in order to check each assumption. Most variables violated the Kolmogorov-Smirnov tests of normality, but other indicators of normality, linearity and homoscedasticity were relatively normal. Birth Control (a subscale of the BSAS) had a very positively skewed histogram, a non-linear Q-Q plot and a boxplot with several outliers and a missing whisker. A number of transformations were conducted on the data, but none of these improved the data, and produced missing data in the histogram. Another subscale of BSAS, Instrumentality, also had a number of outliers on its boxplot, but its histogram and Q-Q plot were relatively normal. Reliability analyses were also conducted for each of the continuous variables included in this study and is reported in Table 5.6.

5.3.4.2 Predictors of Risky Sexual Behaviour

A multiple regression was conducted on the data in order to identify factors that predict self-reported sexual risk, as measured by the Sexual Risk Survey. Bivariate correlations were conducted on variables to be included in the regression analysis and are reported in Table 5.8. Demographic variables, including sexual minority status, gender minority status and religion, STI Knowledge, SCSE scores and scores for each of the 4 subscales on the BSAS measure were entered as predictors into the model. Demographic variables were dummy coded prior to entry into the model, such that the levels of each represented Gender Minority vs Cisgender (reference group) for gender minority status, Sexual Minority vs Heterosexual (reference group) for sexual minority status, and

Religious vs Non-religious (reference group) for Religion. Dummy coding of these variables is not ideal, as it reduces the nuance across levels of these variables, particularly in the case of gender identity and sexual orientation. As such, in Table 5.6 and 5.7 the means for each predictor variable and the outcome variable across levels of sexual orientation and gender identity are reported, for transparency and to represent relative contributions of each group within the dummy coded variables. Mean values for each continuous predictor for the entire sample are reported in Table 5.5. Values from the SRS measure are reported from the untransformed multiple imputation data. Bivariate correlations between all variables to be included in the regression analysis were conducted. Pearson's correlation coefficient and significance values are reported below in Table 5.5.

Table 5.5

Means, standard deviations and ranges for each continuous predictor variable and the outcome variable.

	STI Knowledge	SCSE	Permissiveness	Protection	Communion	Instrumentality	Sexual Risk Survey
Mean	63.87	60.48	26.46	4.03	12.84	15.37	18.63
Standard deviation	16.09	9.33	7.20	1.6	4.31	3.50	13.46
Range	26.95-96.15	20-80	10-48	3-12	5-25	6-25	0-69

Cronbach’s Alpha	.712	0.9	0.82	0.69	0.78	0.62	0.89

Table 5.6

Mean scores and standard deviations for each level within gender identity across each continuous predictor and the outcome variable.

Gender Identity	*N*	Permissiveness		Protection		Communion		Instrumentality		SRS		SCSE		STI Knowledge	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Man	51	24.35	6.31	4.35	1.94	12.69	3.96	16.55	3.67	21.37	16.58	60.48	8.79	60.88	16.46
Woman	190	27.06	7.26	3.94	1.49	12.63	4.38	14.86	3.35	18.8	12.56	60.44	9.63	63.83	15.89
Transman	4	28	11.42	4.75	1.11	18	2.60	18.25	1.33	10.25	1.67	47.46	9.99	75	15.8
Non-binary	17	24.29	6.78	3.94	1.74	13.53	4.45	16.47	3.63	17	11.46	63.29	7.29	70.67	13.55

Gender-fluid	2	35.50	3.65	4	1.04	15	2.09	19	4.18	0	0	61.5	1.57	46.67	14.63
Prefer not to say	2	20	2.09	4	1.04	15.5	.52	15	1.04	3	1.5	52	0	65.82	13.21
Other	3	29	3.85	3.67	.97	15	3.03	16	2.22	10.0	6.0	62.33	.48	74.59	10.42

Table 5.7

Mean scores and standard deviations for each level within sexual orientation across each continuous predictor and the outcome variable.

Sexual Orientation		Permissiveness	Protection	Communion	Instrumentality	Sexual Risk Survey	Sexual Communication Self Efficacy	STI Knowledge
Gay	Mean	22	4.54	11.64	15.45	27.97	59.4	70.59
	SD	7.38	2.25	4.92	2.42	21.46	7.24	15.28
Hetero	Mean	27.45	4.19	11.91	15.05	19.85	60.74	59.38
sexual	SD	6.59	1.78	3.75	3.60	13.39	8.85	14.85
Queer	Mean	25.35	3.71	13.53	15.88	17.11	61.56	73.89
	SD	5.16	1.21	4.24	3.44	12.7	9.51	10.88
Lesbia	Mean	23.44	3.87	13.87	14.87	12.47	58.81	67.14
n	SD	6.81	1.36	4.32	3.34	7.85	9.33	20.51
Bisexu	Mean	25.94	3.65	13.28	15.62	16.79	60.83	68.27
al	SD	8.39	1.22	4.23	3.46	11.6	9.20	15.50

Panse								
xual	Mean	25.64	4.18	12.54	16.64	27.09	64.73	70.86
	SD	4.65	1.33	4.16	3.35	14.72	6.29	16.05
Asexu	Mean	31.8	4.8	22.6	17.2	9.6	45.4	57.29
al	SD	4.97	1.78	2.19	4.32	7.35	18.37	17.84
Prefer	Mean	24.67	3.67	14.67	17.67	16.67	51.3	63.94
not to	SD	10.69	1.15	2.52	1.53	15.25	6.03	18.63
say								
Other	Mean	28.75	4.75	18.75	13.5	9.25	65	45.30
	SD	11.32	1.71	5.38	4.65	10.77	10.03	10.73

Table 5.8

Bivariate correlations between all variables included in the multiple regression and the Sexual Risk Survey responses.

Variable	Mean	SD	1	2	3	4	5	6	7	8	9
1.Gender Minority Status	-	-	-	-	-	-	-	-	-	-	-
2. Sexual Minority Status	-	-	.291**	-	-	-	-	-	-	-	-
3. Religion	-	-	.078**	-.324**	-	-	-	-	-	-	-
4. STI Knowledge	63.87	16.07	.108**	.300**	.021	-	-	-	-	-	-
5. SCSE	60.41	9.4	.003	-.032*	.015	.055*	-	-	-	-	-

6. Permissiveness	26.42	7.22	-.021	-.140**	.038	-.241**	-.081**	-	-	-	-
7. Protection	4.03	1.59	.012	-.109**	-.01	-.062**	-.08**	.134**	-	-	-
8. Communion	12.84	4.31	.115**	.162**	.099**	.027	-.027	-.166**	.053*	-	-
9. Instrumentality	15.38	3.5	.141	.087**	.119**	-.007	-.065**	.179**	-.048*	.085**	-

Note. * Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2- tailed)

Preliminary analyses revealed that assumptions of multicollinearity and independence of residuals were not violated. In terms of multivariate outliers, an acceptable Mahalanobis distance critical value for a regression with 9 predictors is 27.88. The maximum Mahalanobis value in this model was 30.38, indicating the presence of a multivariate outlier. SPSS also produced a Casewise Diagnostics table with four cases, also indicating the presence of a multivariate outlier. However, Cook's distance was less than 1 (.009), indicating that this outlier is not having undue influence on the data. As such, the multivariate outliers were not removed or replaced.

The overall regression model was significant {$F(9, 1590) = 25.98$, $p < .001$}. The model accounted for 12.8% of the variance in self-reported sexual risk scores. Six of the included predictors were deemed statistically significant; 1) Gender minority status, which achieved a beta value of -.087 (t = -3.51), 2) religion, which achieved a beta value of .121 (t = 4.79), 3) SCSE, which achieved a beta value of .071, (t = 2.96), 4) Permissiveness, which achieved a beta value of -.254, (t = -10.01), 5) Communion, with a beta value of -.22, (t = -8.98), and 6) Protection, with a beta value of .12 (t = 4.75).

In Table 5.6, the means for each predictor variable and the outcome variable across levels of sexual orientation and gender identity are reported.

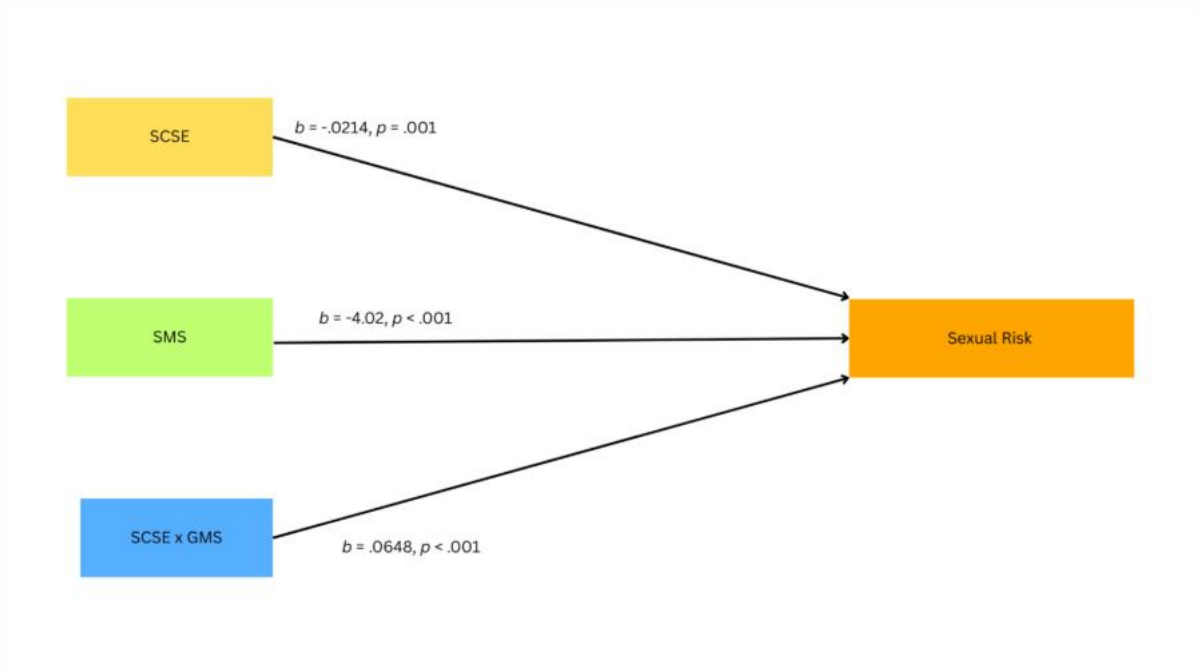
5.3.5 Moderating Effect of Sexual Orientation and Gender Identity on Sexual Knowledge, Sexual Attitudes, and Sexual Self-Efficacy (RQ3)

Four moderation analyses were conducted in order to investigate if sexual (SMS) and gender minority status (GMS) moderated the relationship between the predictors outlined in the above regression and self-reported sexual risk. A full breakdown of results of each moderation analysis can be found in Table 5.6. The first moderation analysis tested whether SMS and GMS moderated the relationship between sexual communication self-

efficacy and self-reported sexual risk, as measured by the SRS. The first model explained 1.73% of the variance in SRS, and was significant {F(5, 1594)= 16.32, p < .001}. The second model, which included the interaction SCSE x GMS, was non-significant. The third model, including the interaction between SCSE and SMS, accounted for an additional 3% of the variance, and was significant {F(1,1594) = 50.21, p < .001}. In the final model, SCSE significantly contributed to the model (B = -.0214, SE = .0065, t = -3.31, p = .001), as did SMS (B = -4.02, SE = .56, t = -7.19, p < .001), and the interaction between SCSE and SMS was also significant (B = .065, SE = .009, t = 7.09, p < .001), indicating that SMS moderated the relationship between SCSE and SRS. This finding indicates that sexual minority status increased the effect of high scores of SCSE on sexual risk.

Figure 5.9

Path analysis of the moderating effect of SMS on the relationship between SCSE and sexual risk.

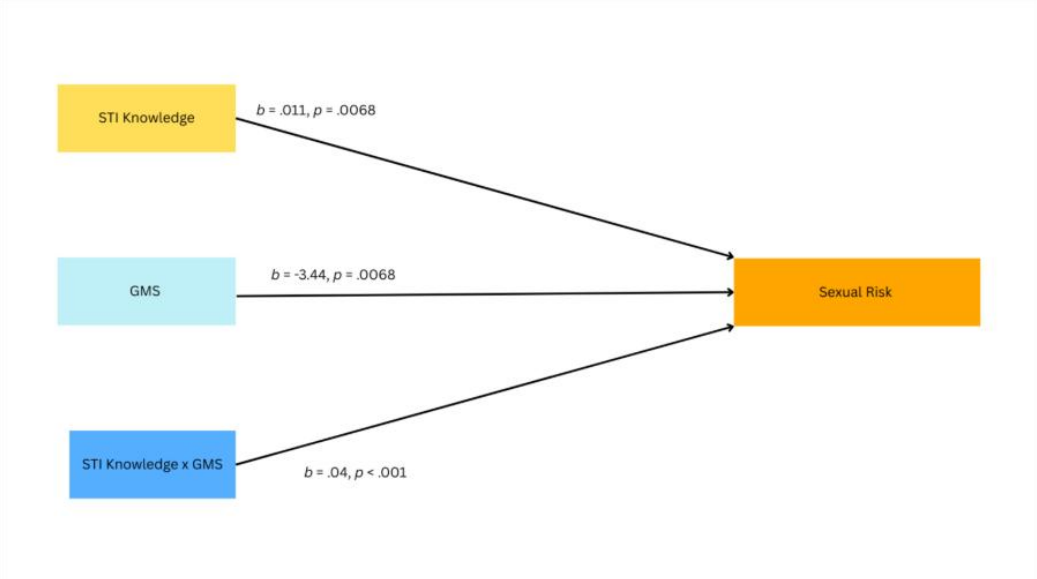


An analysis investigating the moderating effect of SMS and GMS on the relationship between STI Knowledge and SRS revealed statistical significance {F(5,1599) = 9.55, p < .001) and was responsible for .93% of the variance. When GMS was entered into the model it accounted for an additional 1.7% of the variance (B = -3.44, SE = 0.7, t =

-4.92, p < .001). STI Knowledge was also significant at this stage (B = .011, SE = .004, t = 2.71, p = .0068), as was the interaction between STI Knowledge and GMS (B = .04, SE = .01, t = 4.21, p < .001). This result indicates that GMS alone negatively impacts SRS, such that GMS participants reported lower rates of SRS. However, the analysis between STI knowledge and SRS revealed a positive relationship, such that higher rates of STI knowledge resulted in higher rates of SRS. Overall, the positive value of the interaction beta score revealed that the combined impact of GMS and STI knowledge positively impacts SRS. For those with relatively higher scores of STI knowledge, if these participants also have GMS, this will strengthen the impact on SRS, such that scores of SRS will increase.

Figure 5.10

Path analysis of the moderating effect of GMS on the relationship between STI Knowledge and sexual risk.



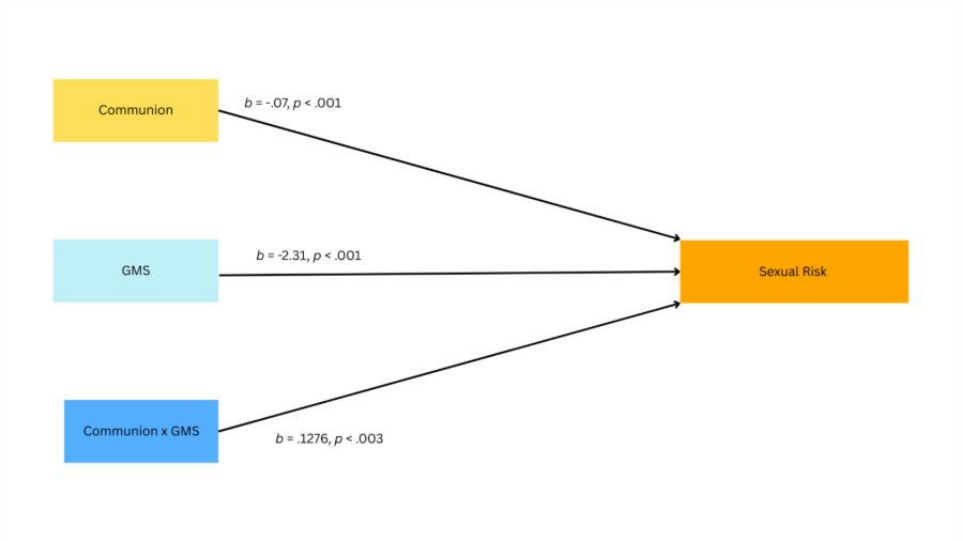
An analysis of the impact of GMS and SMS as moderators on the relationship between Permissiveness and sexual risk was significant {F(1, 1596) = 19.23, p < .001). Permissiveness was a significant predictor in the model (B = -.043, SE = .0085, t = -5.07, p < .001). Neither GMS or SMS moderated the relationship between Permissiveness and SRS. A similar situation was seen in the moderation analysis conducted on the relationship

between Protection and SRS; a significant result for the overall model was returned {F(5, 1599) = 6.34, p < .001, Rsquared = 1.95%), but GMS and SMS were not significant predictors or moderators in this model.

An analysis of the moderating effect of SMS and GMS on the relationship between Communion and SRS was significant and accounted for 4.57% of the variance in SRS. When GMS was entered into the model it accounted for an additional .8% of the variance, and was significant (B = -2.31, SE = .52, t = -4.44, p < .001). Communion was also significant at this stage (B = -.074, SE = .0146, t = -5.08, p < .001). The interaction between Communion and GMS was also significant (B = .1276, SE = .04, t = 3.67, p = .003). This result indicates that typically, as reported previously in this results section, gender minority status decreases rates of SRS. When acting as a moderator, GMS weakens the relationship between Communion and SRS, such that as rates of Communion decrease, rates of SRS increase.

Figure 5.11

Path analysis of the moderating effect of GMS on the relationship between Communion and sexual risk.

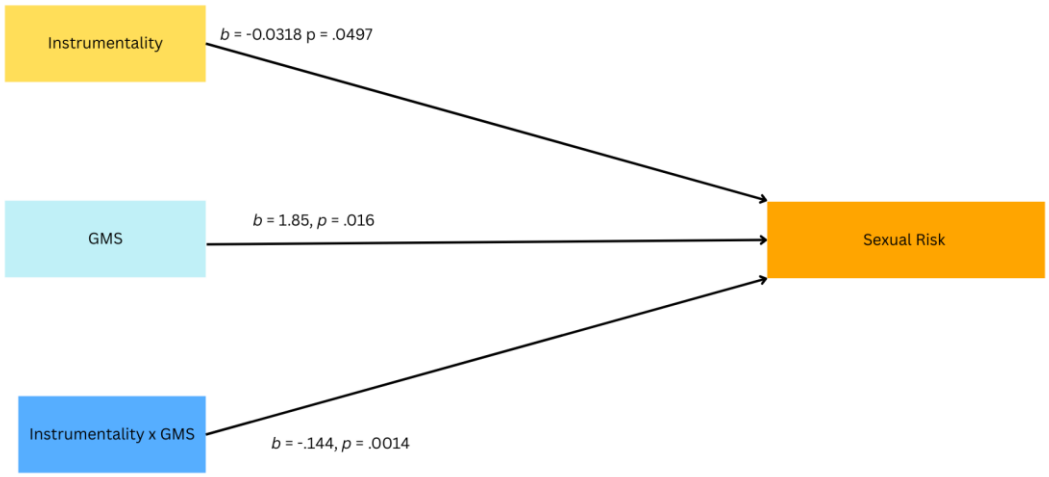


An analysis of the moderating effect of GMS and SMS was conducted on the relationship between Instrumentality and SRS, which brought back a significant model

(F(5, 1599) = 6.79, p < .001) and accounted for 1.45% of the variance. Instrumentality was a non-significant predictor (B = -.0318, SE = .0162, t = -1.96, p = .0497) , as was GMS (B = 1.849, SE = .766, t = 2.412, p = .016). However, once GMS was entered as a moderating variable, it was statistically significant (B = -.144, SE = .045, t = -3.2, p = .0014), and accounted for an additional .63% of the variance. This finding indicates that the impact of Instrumentality on SRS hinges on gender minority status. For gender minority participants, the impact of Instrumentality on SRS is strengthened, such that increased rates of Instrumentality result in increased SRS. SMS was not significant either as a predictor or a moderator.

Figure 5.12

Path analysis of the moderating effect of GMS on the relationship between Instrumentality and sexual risk.



5.3.6 Mediative Effect of Sexual Attitudes and SCSE on the Relationship Between STI Knowledge and Sexual Risk Behaviour (RQ5)

The multiple regression analyses confirmed the significance between the predictors, sexual attitudes and SCSE, and the outcome of interest, which was sexual risk, but STI Knowledge did not predict sexual risk. This is not unsurprising, as it has often been noted in health research that knowledge doesn't necessarily result in behaviour change. As such, a mediation analysis was conducted, in order to identify if sexual communication self-efficacy and the four subscales of sexual attitudes can provide further insight into the relationship between STI Knowledge and sexual risk.

STI Knowledge did significantly predict Permissiveness in this model, b = -.11, 95% CI [-.13, -.09], t = -9.94, p < .001. The R^2 value demonstrated that STI Knowledge

explains 5.82% of the variance in Permissiveness. STI Knowledge was also found to significantly predict Protection, b = -.01, 95% CI [-.0110, -.0013], t = -2.48, p = .0132, with an Rsquared value of .38%. While this value is significant, it is moderately so. It is also important to note again the non-normality of Protection, and that this may have impacted results. Finally, it was identified that STI Knowledge significantly impacted SCSE, such that b = .03, 95% CI [.0014, .0588], t = 2.06, p = .0399. STI Knowledge accounted for .26% of the variance in SCSE. Again, while these results are significant, they communicate a weak, but significant, positive effect of STI Knowledge on SCSE. STI Knowledge did not have a significant effect on either Communion or Instrumentality.

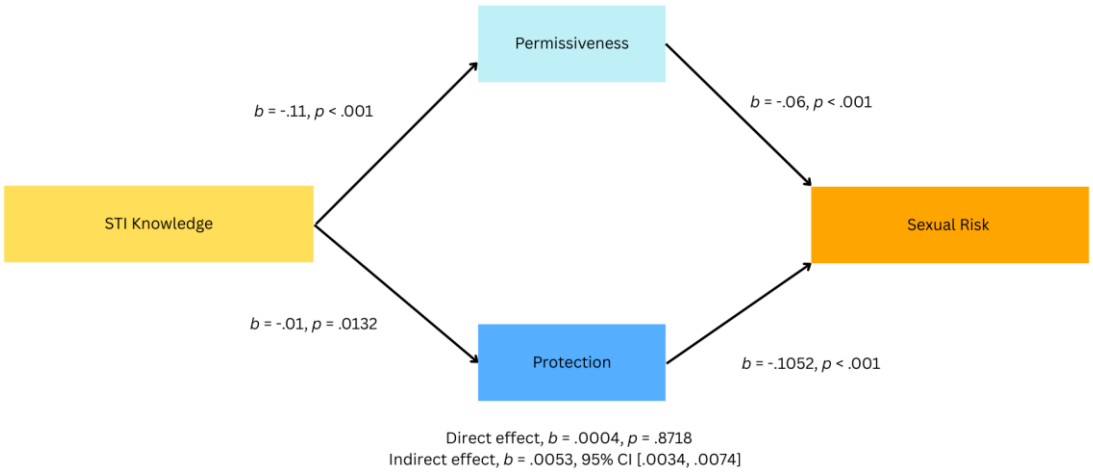
When sexual attitudes and SCSE are entered into the model, the relationship between STI Knowledge and sexual risk is still non-significant. At this stage, the relationships between the mediators and the outcome variable are investigated. The confidence intervals for the indirect effects were a bootstrapped CI based on 10000 samples. The analysis returned that three subscales of sexual attitudes and SCSE significantly predicted sexual risk; 1) Permissiveness (b = -.06, 95% CI [-.07, -.0466], t = -9.79, p < .001), Protection, (b = .1052, 95% [.055, .155], t = 4.14, p < .001), Communion (b = -.0942, 95% CI [-.1127, -.0756], t = -9.95, p < .001) and SCSE (b = .0100, 95% CI [.0016, .0183], t = 2.34, p = .0196).

When looking at the total effect of STI Knowledge on sexual risk, a small but significant result is returned (b = .0057, 95% CI [.0109, .0550], t = 2.1996, p = .028). The test of the direct effect of STI Knowledge on sexual risk was not significant (b = .0004, 95% CI [-.0046, .0054], p = .87). The indirect effect of STI knowledge on sexual risk was found to be significant, (b = .0053, 95% CI [.0034, .0074], SE = .0010), which indicates there is mediation at play in the model. Further analysis indicates that Permissiveness (b = .0063, 95% CI [.0048, .0081], SE = .009) and Protection (b = -.0006, 95% CI [-.0014, -.0001], SE = .0003), specifically were significant mediators within this model. SCSE was

not significant within the model at this stage (b = .0003, 95% CI [.0000, .0008]). A visualisation of the final mediation model can be found in Figure 5.13.

Figure 5.13

Path diagram of STI Knowledge as a predictor for sexual risk, mediated by Permissiveness and Protection. The confidence interval for the indirect effect is a bootstrapped CI based on 10000 samples.



5.4 Discussion

The overarching aim of this study was to expand on the examination of risky sexual behaviour in previous chapters by investigating a broader interpretation of sexual well-being. Within this chapter, there is a particular focus on the impact of education, knowledge, and attitudes on sexual risk behaviour. This study sought to identify social and emotional determinants of sexual risk, such as sexual communication self-efficacy and sexual attitudes. This study was also interested in relating sexual education, both formal and informal, and STI knowledge to self-reported sexual risk. This study examined a wide range of factors relating to sexual behaviour and risk within a population of young people, the majority of whom are either Irish or live in Ireland. For this reason, these results are

novel and can shed some light on the recent trends in STI transmission over the last number of years.

The findings of this study identified gender minority status, religion, sexual communication self-efficacy, permissiveness, communion and protection as significant predictors of self-reported sexual risk.

Levels of sexual risk were relatively low in this sample, when looking at the potential range of values (0-92). However, the mean score of the SRS in this study (18.63) was higher than other research using the same measure: Kaggwa et al. (2022) reported a mean score of 13.4 among Ugandan university students, Wang et al. (2018) reported a mean of 16.19 from U.S. college students, and a mean of 14.4 was reported by Turchik et al. (2015) in a large archival data set from U.S. students.

5.4.1 Experience of Sexual Education

A high volume of participants in this study were unsatisfied with the quality of sexual education they received. It's important to note that not all participants received their sexual health education in Ireland, so the findings from all participants may not specifically relate to the RSE programme in this country. While just under 80% of the sample rated their formal sexual education as ‘Insufficient’, these participants also displayed significantly higher STI knowledge than participants who were satisfied with their sexual education and participants who did not receive such education at all. While this finding at face value seems contradictory, it could be the case that an awareness of insufficient knowledge propelled such participants to search for information elsewhere.

Alternatively, a common complaint in the written feedback that participants gave was that there was an overemphasis of sexual education programmes on the physical health consequences of unsafe sex practises. Participants also noted significant gaps in information relating to emotional or social components of sexual relationships. While

sexual health programmes could have equipped young people with enough information relating to the transmission and symptomatology of STIs, they may have neglected teaching social and emotional skills, leaving participants unsatisfied with the education they received. This aligns with a notable conclusion from the NCCA's review of the RSE programme in Ireland; students reported the tendency for schools to rely on an approach to sexual education that is too biological, and at the expense of socio-biological components (NCCA, 2019). Students also reported in the NCCA review that they can easily access a lot of information relating to sexual health and wellbeing online but expressed the desire to discuss this information in a classroom setting with a competent educator.

Empirical evidence demonstrates the efficacy of comprehensive and holistic programmes of sexual education on a range of sexual health indices. Fernandes and Junnarkar (2019) reviewed holistic comprehensive sex education (CSE) and reported that CSE reduced the spread of STIs and pregnancy, reduced discrimination of sexual orientation, and impacted non-sexual outcomes such as decreasing depression and improving self-esteem. Similarly, a systematic review of the literature on CSE, reported that CSE can improve a myriad of outcomes, including homophobic bullying, greater understanding of gender and associated norms, and supports the development of skills that support healthy relationships (Goldfarb & Lieberman, 2021). The same review reported that evidence suggests the need for framing sex as a normative behaviour, rather than framing sex as problematic or pathological (Goldfarb & Lieberman, 2021).

The findings from this chapter underscore the importance of sexual education programmes, and the opportunity they provide to students to talk about aspects of sexual health, including information they come across online, in a comfortable, participatory environment with a trusted adult. Feedback from students, both within this study and from the NCCA's report (NCCA, 2019), reflect findings from the literature, and speak to the need for comprehensive and inclusive sexual education.

5.4.1.1 Parental & Familial Impact on Sexual Education

Of note, 90.4% of participants reported they felt most comfortable having conversations about sex and relationships with their mother/mother figure. Despite this preference, only about 8% of participants reported that it was 'Very easy' to talk openly about sex with their mother/mother figure. Just under a third of participants reported that sex/relationships never came up in conversation with their father figure (31.8%) , with only 1.7% reporting the same for their mother figure. Evidently, mother figures carry more responsibility with the discussion of matters pertaining to sex and relationships than father figures within this sample. This could be expected to an extent; it is not surprising within Irish culture that fathers and father figures may feel uncomfortable approaching the topics of sexual behaviour. Approximately one-third of participants in this study had never spoken to their parents about sex or relationships. This number is lower than other European findings; Drago et al. (2016) reported in an Italian sample, that just under half of participants had never spoken to their parents about sex.

The results of this study demonstrate how impactful conversations about sex and relationships between parents/guardians and children are. Whether participants had ever discussed sex or relationships with their parents or guardians was not associated with self-reported sexual risk as adults. However, the results revealed that the age at which participants had their first conversation with their parents/guardians about sex and relationships significantly predicted their scores of sexual risk, such that participants who had such conversations later in their lives demonstrated higher levels of sexual risk. While approximately a third of participants had never discussed sex or relationships with their parents, those that did reported a mean age of 13.67 of when they first had a conversation with their parent/guardian about sex or relationships. Notably, the mean age of sexual debut of this sample was 17.41. These findings would suggest that if parents or guardians are having conversations with their children earlier in their adolescence, before they first

engage in sexual behaviour, it may be easier to communicate the benefits of sexually safe behaviour, both physical and emotional, rather than when their children are older and have perhaps already begun engaging in sexual relationships.

Findings from the literature support the value of early and consistent parent-child communication about sexual health and relationships (Nolan & Smyth, 2025; Conlon, 2018). The ESRI published a study in 2020, reporting that young people who had discussed sex and relationships with their parents by age 13 were more likely to have used contraception at sexual debut (Nolan & Smyth, 2020). Conlon (2018) reported that parents are always communicating values and norms to their children, particularly as it pertains to bodies and sexual health, be it intentional or not. Conlon notes that parents' fear of 'getting it wrong' in an area of their child' s development is a significant barrier to parental conversations about sexual health. However, Conlon also notes that parental confidence in these conversations is key, and proactivity can position parents as the drivers of communication about sexual health.

It is important to note that within this sample, reported age of first receipt of RSE was not correlated with sexual risk as an adult, nor the rating of the RSE received. These findings together underscore the importance of the home environment in communicating sexual wellbeing and safety to young people. Parents and guardians evidently have an opportunity to provide their children with the tools and language to protect themselves and others, as they begin sexual and romantic relationships. This finding is supported by Nolan and Smyth (2020), who reported that amongst 17 year-olds from the Growing Up in Ireland study, those who reported sourcing most of their information from their peers rather than their parents, were significantly less likely to report contraception use at sexual debut. While these conversations may be uncomfortable for both parents and children alike, these results would indicate that opening the lines of communication while the child

is still earlier in their adolescence and receptive to advice from their parents, is extremely important in determining safe sexual behaviour as an adult.

The importance of parental-child sexual communication is bolstered by the previously reported finding that sexual attitudes and sexual communication self-efficacy are associated with sexual risk (Armstrong et al., 2021; Quinn-Nilas et al., 2016; Halpern-Felsher et al., 2004). Both of these factors contain ideas, norms and values within a society. Parents who engage in discussions surrounding sex with their children at earlier ages may have more favourable attitudes towards a safe sex model rather than an abstinence approach. By passing on their values through these discussions, they can shape the attitudes and communication skills of their children (Conlon, 2018). Findings from a study of a Portuguese and Spanish sample provide further support for the influence of informal sources of sexual education; Rodrigues et al. (2024) reported that participants who perceived greater influence from informal sources reported more benefits for their sexual health, and greater sex-positivity. Rodrigues and colleagues concluded that input from a variety of formal and informal sources is essential to a well-rounded sexual education, as different sources can offer different consequences and benefits.

While parents and guardians are very impactful in sexual health education, this finding does not diminish the importance of formal sexual education, nor does it posit that parents should be the sole educators of sexual wellbeing. Almost a third of participants in this study have never spoken to their parents/guardians about sex or relationships. Nolan and Smyth (2020) reported that over 40% of 17 year-olds surveyed had never discussed sex and relationship issues with their parents. Parents can also have gaps in their knowledge, and parents who do have gaps can feel embarrassed and be unable to answer questions from their children (Zhang & Yuan, 2023). Irish parents do generally feel that RSE is important, but don’t feel equipped to do it well themselves (Conlon, 2018), again highlighting the need for a robust programme of sexual education in an Irish context.

5.4.2 Knowledge of Sexually Transmitted Infections

STI knowledge did not significantly predict self-reported sexual risk. This finding is interesting, as participants did score above average on the measure of STI knowledge. This finding provides further support for some of the findings from the NCCA appraisal of the RSE programme (NCCA, 2019); as illustrated in the introduction, many of the students who took part in that assessment felt that lessons relating to the social, emotional and mental well-being components of sexual health were lacking in the RSE curriculum. It would appear that within this study, the factors relating to these determinants were the most impactful in predicting sexual risk. This was also a point that was emphasised in many of the responses provided by participants in this study when asked to comment on their sexual education.

Participants in this study scored an average of 63.87% in STI knowledge. This is slightly higher than other research with a similar cohort; in a study of high school and university students, participants scored an average of approximately 57%. Voyiatzaki et al. (2021) reported an average score of STD knowledge 44.65% in a sample of Greek young people. Warner et al. (2018) reported that in a sample of U.S. medical students, participants scored an average of 66% in a measure of sexual knowledge. As stated previously, two factors make it difficult to compare the results of STI knowledge from this study to other research: firstly, measures across studies are different and may be focusing on different aspects of sexual behaviour (for example, some measures focus on HIV knowledge). Secondly, some studies reporting sexual knowledge have opted to report descriptive data from individual questions rather than a composite, overall score (Grad et al., 2018, Drago et al., 2016, Eksi & Komurcu, 2014). As such, future research should seek to develop and identify standardised measures of STI knowledge, and establish scores of STI knowledge across cultures. This can lead to meaningful comparison, and

interrogation of the role of culture on sexual knowledge and by extension, sexual behaviour.

It is important to note the relative value of high vs low levels of STI knowledge. None of the participants received a score of 100%, and the average score was 63.87%. While higher values of STI knowledge were associated with higher levels of sexual risk through the pathways outlined above, that is not to say that total STI knowledge resulted in extremely high levels of sexual risk, as the reported levels of sexual risk are quite low.

5.4.2.1 Mediative Effect of Sexual Attitudes on the Relationship Between STI Knowledge and Sexual Risk

As reported in the multiple regression, STI knowledge did not significantly predict sexual risk. This finding was not unexpected; previous research has highlighted that the relationship between knowledge and behaviour is rarely linear (Alves, 2024). In line with the research questions for this study, a mediation analysis was conducted in order to investigate if factors such as attitudes and SCSE could highlight alternative pathways through which knowledge impacts behaviour. This mediation suggested Permissiveness and Protection as significant, but weak, mediators. In this model, as STI knowledge increased, self-reported sexual risk also increased, through Permissiveness and Protection. That these subscales from the Brief Sexual Attitudes Scale (Hendrick et al., 2006), are the only significant mediators is surprising, and on the surface appears conflicting. Permissiveness represents attitudes towards casual sexuality, and Protection represents attitudes towards a responsible and tolerant sexuality.

A potential explanation for these results may be that those who have greater STI knowledge and are aware of that, may perceive that their knowledge affords them some protection against the negative consequences of sexual risk. While this in itself may not be true in reality, perhaps there is some truth that such individuals will be better equipped to deal with the consequences of sexual risk. For example, they may be able to acknowledge

their risk behaviour and seek STI testing or may be able to identify symptoms of STIs more quickly than those with lower knowledge. This seemingly contradictory finding has been reported in other research; in a study aiming to predict safe sex intentions (Hardeman et al., 1997), it was stated that high-risk females reported better sexual communication skills and higher levels of HIV knowledge, with the authors citing a potential false sense of security among this group. It may also be the case that individuals with high STI knowledge and sexual risk scores may have garnered some of their knowledge through experiencing STIs themselves as a result of their behaviour. Future research should aim to explore this idea further, as previous research has indicated that a history of an STI diagnosis is associated with both increases and decreases in future condom use (Tremblay et al., 2024). There has also been some evidence to suggest that there is a gender difference in how prior STI diagnosis impacts future protective sexual behaviour (Tremblay et al., 2024).

It does still seem counterintuitive that those with relatively higher levels of STI knowledge should engage in higher levels of sexual risk, because presumably these individuals should be more informed about the risks, and therefore, be more risk avoidant. There may be evidence to suggest that, for health behaviours more generally, this relationship works in the opposite direction to what was theorised in this study. For example, in a study investigating the relationship between health-related knowledge and health risk behaviours among Portuguese university students, it was reported that increased health knowledge leads to riskier behaviours, such as increased alcohol and drug use (Alves, 2024). Alves also noted that as such, students engaging in the most risky behaviour were the most informed about the risks associated with their behaviour, and suggested there may be increased information-seeking amongst those with risky tendencies. While Alves' research investigated other risk behaviours, these findings suggest that rather than STI knowledge impacting sexual risk, it may be the case that it is increased sexual risk

which impacts the acquisition of STI knowledge. Future research should seek to determine the direction of the relationship between knowledge and risk-taking behaviour; specifically, is it the case that those with higher STI knowledge feel more informed and therefore are more comfortable with risk taking or is it that those who have higher risk taking tendencies seek out more information about their behaviour. This information can be utilised to inform strategy within public health campaigns.

The mediating variables in the model in this study help to shed some light on the relationship between STI knowledge and sexual risk. Those with greater STI knowledge had more positive attitudes towards protection, but still reported higher levels of sexual risk. While SCSE was significantly predicted by STI Knowledge, and itself predicted sexual risk, it was not a significant mediator within the model. These findings together may suggest that while more informed individuals have more positive attitudes towards protection, they lack the self-efficacy to promote sexual safety within those contexts. Downing-Matibag and Geisinger (2009) noted that student's perception of their own susceptibility to STIs can be misinformed, and that situational factors such as spontaneity can undermine self-efficacy in sexual contexts. As was also reported in Chapter 3, situational variables such as sexual arousal can derail intentions to engage in safe sex. The findings from this chapter and Chapter 3 taken together underscore the significant impact of context in sexual decision making.

The findings from Alves (2024) may also shed some light on the mediative role of permissiveness in the relationship between STI knowledge and sexual risk in this study. If individuals who engage in higher levels of sexual risk seek out information about their behaviour, it would also make sense that such individuals would endorse more positive attitudes to casual sex (as measured by Permissiveness). Future research should seek to identify the nature of the relationship between STI knowledge and attitudes towards casual sex, and the direction of this relationship.

5.4.3 Contextual Factors Impacting Sexual Behaviour Variables

5.4.3.1 Religion

Religion significantly predicted sexual risk, such that those who identified themselves as religious in some capacity reported higher levels of sexual risk. This finding contradicts other similar research in this area; Armstrong et al. (2021) reported that religious commitment was associated with less self-reported sexual risk in a sample of college-aged women. In a qualitative study looking at the impact of religion among Black and ethnic minority youth, it was reported that those with scripture in their religion frequently referred to the scripture when describing their personal or community values pertaining to sex and sexual relationships (Testa & Coleman, 2006). Bivariate analyses of the study reported in this chapter also revealed that religious participants had significantly lower affiliation with Communion (attitudes that sex is the ultimate form of human connection) and Instrumentality (attitudes towards the physical utility and importance of sex). This finding is supported by other research; for example, a study conducted on British teenagers reported that religious students generally reported more conservative attitudes towards sex (Coleman & Testa, 2008). In their study on religion and sexual attitudes (as measured by the BSAS), Armstrong et al. (2021) reported that religious commitment was significantly correlated with lower endorsements of Communion and was significantly correlated higher endorsements of Permissiveness and Birth Control (the equivalent of the Protection subscale in this study).

A potential explanation for these results is that of the 48.3% of participants that identified themselves as religious, 77.7% identified themselves as Roman Catholic. As Ireland historically would have been a predominantly Catholic society, this 77.7% may represent a loose affiliation with the culture of Catholicism, rather than an indication of significant religious commitment. In recent years, the Roman Catholic church in Ireland has seen decreases in active members, despite the fact that there is a commonly held

conviction that Ireland has a largely Catholic culture. This is also bolstered by the fact that many public schools in Ireland are explicitly Roman Catholic schools; in 2023 it was reported that 77.9% of Ireland's primary and post-primary level schools had a Catholic ethos (DoE, 2023). The number of such schools, which are also typically gendered, is much higher in Ireland than in other European countries. Schools with such a religious ethos may be more likely to promote an abstinence based or a biological approach to sexual education, in line with the values of Catholicism. It is also noteworthy that it was commented by a number of participants in this study that they felt the Catholic ethos of the schools that they attended, informed the school's approach to sexual education, which normally consisted of either an abstinence approach or an exclusively biological approach. While there was no significant relationship between STI knowledge and religion in this study, future research could explore the relationship between schools with a religious ethos, the chosen model of sexual education, and sexual risk in an Irish context.

5.4.3.2 Gender Minority Status and Sexual Minority Status

While sexual minority status (SMS) was significantly correlated with gender minority status (GMS) ($p < .01$), SMS itself did not predict self-reported sexual risk. GMS did predict sexual risk, such that those with a score of 0 (cisgender men and women) had higher rates of sexually risky behaviour. This presents an interesting finding, as the literature often identifies gender minorities, in particular trans women, as having a high burden of STIs (Brown et al., 2024) and poor sexual health (Gil-Llario et al., 2020). However, it is apparent from the findings within this study that gender minority status potentially acts as a protective factor in sexual risk. This may be due to the fact that the transgender participants in this study were trans-men and non-binary. Prior research has identified that transgender women experience more difficulties in their sexuality than trans-men (Gil-Llario et al., 2021). While it has been noted that trans-men do experience higher risk in some domains of sexual health, they engage in safer sexual behaviour than

their cisgender men and women; for example, it has been reported that transgender MSM access sexual health services less than cisgender MSM, but trans MSM had fewer sexual partners than cisgender MSM, (Appenroth et al., 2022). There are gaps in knowledge surrounding the sexual health and welfare of trans-men in particular (Kerckhof et al., 2019). Evidently, there is a complex relationship between gender identity, sexual health behaviour and the evaluation of risk. Future research should aim to explore the nuance between these variables.

The moderation analysis conducted in this chapter indicated SMS is a significant moderator of the relationship between SCSE and sexual risk. In other words, for sexual minorities, higher SCSE scores is associated with increased sexual risk. This finding is surprising, as previous research would imply that increased self-communication self-efficacy is associated with a decrease in sexual risk (Quinn-Nilas et al., 2016). Also interesting, is the uniqueness of this association to sexual minorities; the moderation analysis indicated that amongst all participants there is a negative association between sexual risk and SCSE, as expected. It has been surmised in previous research that increased self-efficacy can increase risk behaviours, as it can engender unrealistic expectations of one's own control and competence in risky situations (Jaspal & Yenihayat, 2024). Jaspal and Yenihayat reported in a moderation analysis that higher identity resilience self-efficacy was associated with a higher indices of sexual risk amongst gay men. Furthermore, a study of self-efficacy and agency amongst Ugandan adolescents reported that a number of participants who reported sexual self-efficacy could not actualise their efficacy in sexual encounters (Kisaakye et al., 2023). This inability to convert efficacy into agency then presents itself as a barrier to more protective sexual behaviour. Further research is required to confirm the results of this study, that increased SCSE amongst sexual minorities is associated with increased sexual risk, and to identify which of the reasons outlined is responsible for this association.

The moderation analysis investigating the moderating impact of GMS on the relationship between STI knowledge and sexual risk, indicated that GMS is a significant moderator in this relationship. In other words, for gender minority participants, the significant relationship between STI knowledge and sexual risk was especially strong. The reasons for this result could be similar to what was reported above for sexual minorities and the impact of SCSE on sexual risk; perhaps increased knowledge affords participants a sense of invincibility, a point which was also noted on the overall analysis of STI knowledge and sexual risk. However, it could very likely be the case that increased knowledge may not be easily actualised for gender minorities in situations involving sexual risk. A lack of sexual agency and autonomy, as seen in other marginalised groups, may result in difficulties translating knowledge into behaviour. For example, Black women have been found to adhere to sexual scripts which compromise their sexual agency and safety, in order to endear themselves to their sexual partners (Bond et al., 2021). While the relationship between STI knowledge and sexual risk may be complex within the general population, this may be especially true for gender minorities who, as a result of marginalisation, experience less agency and control in their sexual relationships.

A small but considerable number of lesbian participants responded ‘N/A’ to a number of questions related to condom use on the Sexual Risk Survey. One respondent indicated ‘N/A - Lesbian’. Presumably, these participants felt condom use was not relevant to them, which in itself, evidences a lack of sexual education. Condom use is encouraged amongst lesbians who may have male reproductive organs. Condoms are also encouraged for use with sex toys, particularly if they’re being shared with more than one partner, in order to prevent the spread of STIs.

5.4.4 Potential Limitations

There were some difficulties involved with collecting sexual risk data with the Sexual Risk Survey. While a benefit of the measure is that it allows for participants to respond to questions using free text, a major shortcoming of the measure within this study was that participants did not always respond to the instructions given and responded at times with text. This made some of the questions very difficult to score. A number of participants were also able to avoid answering questions on this measure altogether by hitting the spacebar, which Qualtrics accepted as a response. This resulted in a relatively high amount of missing data within this measure, which was over 4.5% before text responses were recoded. This issue has also been reported by Turchik et al. (2015) and by Turchik and Garske (2009), both of which noted missing data as an issue with this measure. Neither of these papers provided a reason for the missing data. Future research using this measure should investigate using a fixed response method, such as a sliding scale, or other options whereby only numerical data can be provided.

A limitation identified in the first empirical study of this thesis, reported in Chapter 3, was dummy coding sexual and gender minority data into a single variable, as a result of low samples. A similar procedure was used in this study, however, there were enough numbers to facilitate a single dummy coded variable representing gender minority status (such that 1 = gender minority status, 0 = not) and a similarly coded variable representing sexual minority status. This action was taken as it was a key aim of this study to look at the predictors of sexual risk across gender identity and sexual orientation. Comparison of means across groups would not have been possible, as the sample sizes were too low. Similarly, including each level of the groups in the regression analysis as dummy coded variables was not possible either, as including that number of variables would have seriously impacted the power of the regression analyses. While previous research has correctly identified that dummy coding complex variables such as gender identity and

sexual orientation reduces the nuance between groups in these variables (Taggart et al., 2019), this research aimed to counteract this effect in two ways; 1) by interpreting results cautiously, and 2) by reporting mean results for each predictor and for the outcome variable, so that differences between the levels in these variables were represented visually. Future research investigating differences across gender identity and sexual orientation should aim to over recruit from these groups, in order to facilitate in depth analysis and retain nuance between groups.

The degree of religiosity was not measured within this study, limiting the depth of analysis between this variable and other salient variables, such as sexual attitudes. Religion significantly predicted sexual risk, and is particularly relevant to sexual education, particularly within the Irish education system. An understanding of the extent of participants' religious commitment outside of the religious affiliation of their primary/secondary school, may reveal more about how their particular faith system impacts their sexual behaviour.

While there were several significant results in this study, many of the relationships between variables, particularly in regression analyses, were quite weak. This may be due in part to the sample size. While 276 participants were enough to satisfy power analysis for the study, there may not have been enough participants to identify stronger relationships between variables. This may be especially true considering the amount of analysis that was conducted on the data, and the amount of data provided by participants. While many strongly significant relationships were returned in the analysis for this study (such that $p < .001$ in some cases), it is worth repeating that results must be interpreted with caution.

5.5 Conclusion

This chapter extends the research conducted thus far in this thesis and adopts a broader interpretation of sexual health and wellbeing. This chapter builds upon previous

research, by continuing to identify factors which significantly impact and predict sexual risk but extends it further by analysing relationships between these variables in order to identify how they may bolster sexual wellbeing. This chapter contributes novel findings to the landscape of sexual education and public health in an Irish context and situates the sexual health and aspects of sexual wellbeing experiences in young adults in Ireland. This chapter also contributes novel findings to the literature in sexual health at large by bringing together insights from sexual health *and* sexual wellbeing, a combination rarely addressed in the literature.

The findings of this chapter support the previously asserted viewpoint that sexual wellbeing is complex. Relationships between factors such as sexual attitudes, STI knowledge and sexual risk are intricate and can seem contradictory at first glance. The findings of this chapter have also aided in identifying differences and similarities between gender minorities, sexual minorities, and the general population in terms of sexual risk and its impacting factors.

Chapter 6

6.1 Summary of the Programme of Research

6.1.1 Purpose

The overarching aim of this thesis was to merge a risk-based approach to understanding sexual decision making with an approach that acknowledges the complex situational factors that influence decision making in sexual domains. This chapter will detail a summary and key findings from each chapter in this thesis, with a focus on the overarching aims of this programme of research, and how the main research questions have been addressed. The chapter will also synthesize findings with a view to highlighting the impact of this research on the current context, in terms of public health, sexual education and our understanding of sexual decision making in young adults. Strengths and limitations from each chapter will be discussed. Recommendations for future research will be provided, as well as concluding statements on this body of research.

The literature reviewed in Chapter 1 of this thesis identified the predominant approaches to sexual health within the wider literature. These approaches included a biomedical approach, which focuses on illness and disease within sexual health, and prevention of transmitting illness. A salutogenic approach offers a different perspective, which focuses on factors that support health and wellbeing. Therefore, the purpose of this programme of research was to utilise both perspectives of sexual behaviour, in order to deepen our current understanding of how people make sexual decisions. This aim was developed with a specific view to conducting empirical research that would be of value to public health policy and sexual education.

6.1.2 Overview of Research

Chapter 2 reported a systematic review of the literature, which sought to identify and evaluate the paradigms used to capture sexual decision making among young people. Of the 6,230 papers screened throughout the review process, 41 papers met the inclusion criteria for the project. The review provided an overview of the experimental paradigms that had been used to quantify sexual decision making and identified the paradigms most suited to measuring domain-specific sexual decision making. The review also outlined measures used to quantify sexual behaviour in this literature.

Chapter 3 reported the first empirical study of this programme of research. This study aimed to identify the impact of state and trait variables on risky sexual behaviour. Participants completed a battery of assessments, which measured fatigue, monetary discounting, self-reassurance and self-criticism, and measures of emotional affect. The study also comprised of a longitudinal component, whereby participants answered a daily questionnaire about their levels of sexual arousal and risky sexual behaviour over the course of 30 days. This component was included in order to further elucidate the relationship between risky sexual behaviour and sexual arousal. The findings of the study emphasised the impact of state-level variables on engagement in sexually risky behaviour.

Chapter 4 investigated the impact of public health materials, presented as a sexual health prime, on rates of sexual decision making (as measured using sexual delay discounting and sexual vignettes) and STI risk perception. The impact of the sexual health prime was compared to two other conditions: a general health prime, taken from a HSE sun safety campaign, and a control condition, taken from a recycling campaign. Primes were presented to participants in a naturalistic environment, as pop-up advertisements on a fictitious celebrity news website. Following exposure to each prime, participants completed measures of sexual delay discounting, sexual vignettes and STI risk perception. A pre-experiment was utilised in this study to develop measures for the experiment. An

advisory group was also developed and consulted in order to facilitate development of the experiment and associated measures.

Chapter 5 outlined a comprehensive survey, measuring a myriad of factors impacting sexual risk. Sexual communication self-efficacy (SCSE), STI knowledge, experiences of formal and informal sexual education, and sexual attitudes were each measured, in order to develop a model of factors impacting sexual risk. Measures for this study were developed in collaboration with the HSE's Sexual Health and Crisis Pregnancy Programme (SHCPP).

6.2 Key Findings

The aim of the systematic review reported in Chapter 2 was to identify the most effective experimental paradigms for measuring domain specific sexual decision making amongst young people. The findings of this review identified that monetary delay discounting is more suited to measuring a more general process of decision making, and it is not best equipped to tap into the specific mechanism within decision making in sexual contexts. Furthermore, the results of the review indicated the most suitable measures were sexual probability and sexual delay discounting (SPD/SDD) and sexual vignettes. The review also identified considerable gender differences in the evaluation of risk in sexual contexts, as well as gender differences in response to sexual primes. Furthermore, a lack of participant diversity within the literature was identified, whereby participants were mostly heterosexual, with non-heterosexual participants being excluded in some papers. Some studies did investigate sexual decision making within gay men/men who have sex with men (MSM), but bisexual women and lesbian women are largely overlooked within this literature. Similarly, gender diversity was largely ignored within this literature, with the vast majority of participants assumed to be cisgender.

The key findings from Chapter 3 supported the results of the systematic review, and further demonstrated that while monetary delay discounting may be suited to measuring a generally risky type of decision making, it may not be as suited to measuring a domain specific type of decision making such as that within sexual contexts. The findings of this study revealed no discernible relationship between rates of monetary discounting and sexual risk, as measured by the CARE scale. The findings of this study also highlighted the significant impact of contextual, state level variables on sexual decision making which had been identified in previous literature (Rendina et al., 2018). Fatigue, sexual arousal, and aspects of emotionality were all found to significantly impact levels of sexual risk. The lone significant trait level variable was self-hate, a subscale of the Self-Criticising and Self-Reassuring scale (Sommers-Spijkerman, 2018). This factor was found to be highly related to sexual risk across participants but was found to be more common amongst sexual and gender minorities. In response to the finding that experimental literature within sexual decision making was lacking diversity of sexual and gender minorities, a specific attempt was made to recruit participants from these populations, which came with specific recruitment challenges. Finally, due to high rates of attrition, analysis of the longitudinal data, which sought to address the relationship between sexual arousal and risky sexual behaviour, was extremely inhibited. However, it was revealed that the measurement of sexual arousal on Day 1 was highly correlated to scores across the remaining days from the daily diaries.

As a follow up to the results of both Chapter 2 and Chapter 3, Chapter 4 detailed an experiment whereby vignettes and SDD were utilised to quantify sexual decision making. In particular, this study addressed the impact of sexual primes, taken from actual public health materials. The majority of the findings from this study were null findings. A number of potential explanations for these null findings were explored within Chapter 4, including that the analysis may have been underpowered. However, despite the null results for the

main hypotheses of this experiment, the results from the SDD task indicated that participants did respond as expected to the partner conditions within the experiment, and that there were significant differences between almost all partner conditions.

Chapter 5 was situated within a specific gap in the literature, whereby the impact of salutogenic factors on sexual risk behaviour amongst young Irish people are investigated. This study was designed to incorporate findings from the National Council for Curriculum and Assessment's (NCCA) evaluation of the Relationships and Sexuality Education (RSE) programme (NCCA, 2019), to identify the impact of education, alongside a myriad of other factors, on sexually risky behaviour. Two sexual attitudes, Permissiveness (attitudes towards a casual sexuality) and Protection (attitudes towards shared responsibility for safety) were found to significantly predict scores of sexual risk. The majority of participants reflected that their sexual education was 'Insufficient', and most participants felt more comfortable communicating with their mother or mother figure about topics related to sex and relationships. Informal sexual education, in particular the age at which participants first had a conversation with their parents about sex or relationships, was found to be more significant on sexual risk than indicators of formal education. The findings also revealed an indirect, complex relationship between STI knowledge and sexual risk behaviour, mediated by sexual attitudes. Analysis of the factors impacting sexual risk across sexual and gender minorities was limited due to sample size, however the analysis that was conducted indicated some slight differences in the impacting factors on sexual risk for sexual and gender minorities.

6.3 Contributions to Literature

6.3.1 Gap in Irish context

The findings of this programme of research are situated within a very specific gap in the Irish context. Ireland's rapidly changing cultural context has been noted elsewhere in this thesis; of particular note, the increased visibility and cultural acceptability of particular demographic groups (such as migrant and LGBTQ+ groups), and Ireland's continued development as a secular society. Furthermore, rates of sexually transmitted infections (STIs) rose dramatically between 2019-2024, according to the Health Protection Surveillance Centre. While overall rates of STIs decreased by 11% last year, rates were still 31% higher than 2019 (HPSC, 2025). Changes have been made to sexual health policy in the last number of years, with the review of the National Sexual Health Strategy by Crowe (2023) noting the successes of this strategy. Actions such as free hormonal contraception for women aged 17-35 and at home STI testing kits, have potentially all contributed to the noted decrease in STI transmission in 2024, the pattern of which is continuing into 2025. If nothing else, these actions have improved accessibility to sexual health care; it was noted by McConnell et al. (2021) that the cost of contraception remained a significant barrier to effective sexual healthcare in Ireland. It is however, important to note that the free contraception programme for women aged 17-35 does not extend to condoms or dental dams, so does not cover physical barriers, and as such does not prevent the spread of STIs.

While these improvements have been noted, some issues remain. The NCCA's review of the RSE programme detailed many flaws within sexual education within Ireland (NCCA, 2019). Of particular note within this review, was present and past students' consistent feedback that not enough time or resources were devoted to teaching social and emotional regulation skills that are required to navigate sexual and romantic relationships during a time as complex and fast developing as adolescence and young adulthood. Participants in the review were also unsatisfied with content pertaining to consent,

LGBTQ+ issues, the proliferation of pornography and the impact of social media and the internet on sexual self-esteem. Educators of RSE felt unsupported in teaching complex and nuanced content related to these issues. While this review details the experiences of formal sexual education amongst young adults, it is unknown how these experiences shape sexual behaviour. Equally, the impact of formal sexual education on social and emotional skills, and their overall impact on behaviour are not explored within this report. Therefore, this programme of research sought to directly answer this question, by evaluating the experiences of formal and informal sexual education, and directly investigating their impact on sexual risk behaviour.

The increased visibility of sexual health promotion materials online by the SHCPP has been noted. However, the efficacy of these materials and their impact on sexual decision making has not, as far as this author is aware, been investigated. This programme of research again speaks to a specific dearth of literature within the Irish context as to the efficacy of the approaches to combatting increases in STIs.

6.3.2 Ecological validity of public health materials

An essential aim of this research was to produce research with utility in public health and sexual education. As such, it was vital to include key stakeholders and materials from public health materials, in order to ensure ecological validity of the studies. Furthermore, a key learning from the first empirical study in this programme of research was that stakeholder involvement would be essential in executing the planned recruitment strategy for this research. As such, from this point onwards, stakeholders were involved in each subsequent study. Key stakeholders were consulted in the form of an advisory group in the study reported in Chapter 4. As described in that chapter, the key stakeholders consisted of representatives from the SHCPP, Health Ireland initiative and the DCU Students' Union. This advisory group was consulted throughout the study design process

and helped to develop the materials used in the study, to ensure their realism and applicability to young people in sexual contexts. Through this process, the SHCPP provided this study with real materials from their digital sexual health campaign to use in the experiment. Similarly, real materials from the HSE's SunSmart campaign and real materials from a recycling campaign were used in this experiment. These materials were presented to participants in such a way that would replicate how they would come across these materials online: as pop-up advertisements on newspaper articles. This procedure was followed in order to ensure the ecological validity of the experiment, so that participants could be shown real public health materials in a way that was naturalistic, in order to see how this naturalistic exposure would impact their sexual decision making.

This realism adds to the novelty of the research, as the immediate effectiveness of these specific materials have not been investigated experimentally before. While the long-term impact of these materials can be estimated through visibility of the materials and changes in health surveillance reports, the immediate impact of these materials was heretofore unknown. While the results of Chapter 4 indicated that the materials did not have any immediate impact on sexual decision making or STI risk perception, this may provide us with some insight into how these materials may impact behaviour. Rather than immediately changing the ways in which participants behave and make decisions in sexual contexts, the materials and information within may instead be part of a process that builds decision making over time. These findings are vital for our understanding from a public health perspective, of how and why public health materials are successful. These results strengthen the designing of these types of public health campaigns, as there is increased awareness of how the associated materials work within a target population.

6.3.3 Measuring Sexual Decision Making Experimentally

A key aim of this research, beginning in Chapter 2, was to identify the most suitable measures for quantifying domain specific sexual decision making. It has been stated throughout this thesis that sexual decision making is distinct from other types of decision making. It has also been identified in a review of the literature on sexual decision making that there existed a surplus of measures in the area (Johnson et al., 2021), with no indication as to a gold standard of measures. The findings of both the systematic review (detailed in Chapter 2) and Chapter 3 support findings from previous research that sexual discounting, and perhaps by proxy sexual decision making, is distinct from that of other outcomes. Among the major findings of the systematic review was that sexual delay discounting is domain specific. Studies included in the review that measured both monetary and sexual delay discounting reported that either there was no significant relationship between rates of both types of discounting (Lemley et al., 2017), or that there was no significant relationship between monetary discounting and scores of sexual risk (Jones et al., 2018). The results of the systematic review indicated the most suitable measures of domain specific sexual decision making were sexual delay discounting and sexual vignettes. Chapter 2 also indicated that more general measures of sexual decision making, such as monetary discounting, may be too general a measure to adequately tap into the specific mechanism of sexual decision making.

As such, monetary delay discounting was utilised in the first empirical study, with the intention of testing if the predictive power of monetary discounting could be increased by also measuring state and trait variables. The findings of the first empirical study would suggest that this is not possible; results from this study indicated that delay discounting did not significantly contribute to the model of risky sexual behaviour, nor did it account for any notable amount of the variance in risky sexual behaviour. This was supported by other research in the area; a systematic review conducted by Johnson et al. (2021) reported that

of the papers included in their review looking at monetary discounting and sexual risk, there was a small effect size. The authors reported this was likely due to the limited focus of a more general type of decision making, such as that related to money, that monetary discounting comprises. Similarly, Lemley et al. (2017) reported no significant relationship between monetary delay discounting and either sexual delay or probability discounting. These findings indicate the value of using domain specific discounting paradigms in experimental research.

While some research has reported the lack of association between monetary discounting and sexual risk behaviours, it would appear that monetary discounting is related to some other health risk behaviours, but some of the results from these studies can be conflicting. For example, Lemley and et al. (2017) report that monetary discounting was significantly associated with scores of alcohol discounting. A 2023 systematic review identified delay discounting as a predictor of substance use behaviour, but not treatment outcomes (Exum et al., 2023). This issue, in combination with findings from this research, would indicate that perhaps there is value in employing tasks that measure discounting of outcomes that are not just hypothetical money. Delay discounting has the capacity to tap into decision making of clinically meaningful outcomes, as shown by sexual delay discounting (Johnson et al., 2021; Lawyer & Schoepflin, 2013). Adopting discounting paradigms to include outcomes that are meaningful within clinical groups could lead to discounting paradigms that are more sensitive to individual differences and provide more accurate results (Gebru & Wongsomboon, 2022). Future research may wish to explore utilising the discounting paradigm to include outcomes that are of particular relevance to certain groups, in the hope that these would give way to more insightful results.

The findings of Chapters 2 and 3 determined the measures of sexual decision making used in Chapter 4. In Chapter 2, SDD and sexual vignettes had emerged as two paradigms that measured domain specific sexual decision making, as they were highly

related to self-reported measures of sexual risk. As such, these measures, along with STI risk perception, were used to quantify sexual decision making in Chapter 4. Despite research supporting both SDD and vignettes as sensitive and reliable measures of sexual decision making (Johnson et al., 2021; Skakoon-Sparling et al., 2016) there were no significant differences between responses on these measures across the three experimental conditions within Chapter 4. However, as has been discussed in Chapter 4, this is likely not due to a flaw within the measures themselves, rather than a lack of a direct relationship between increased knowledge and an immediate change in behaviour.

The AUC values (indicators of the SDD task), however, did vary significantly by partner condition. In short, this indicates that the SDD task did likely operate successfully, as participants responded as expected to the partner conditions within the SDD task. This provides further evidence of the domain specificity of this measure, and its suitability for measuring sexual decision making specifically. These results also underscore the distinctiveness of sexual decision making from other types of decision making, which had been asserted by the results of Chapter 2. As far as the author of this thesis is aware, the study in Chapter 4 has been the first to investigate sexual delay discounting in a population of young, predominantly Irish people. This underscores the novelty of this research, and the importance of establishing gold standards of measures in particular contexts. While no self-reported measures of sexual risk were used in Chapter 4, future research should seek to ensure the relationship between the two variables in an Irish context.

6.3.4 Relationship Between Knowledge and Risky Sexual Behaviour

The indirect relationship between knowledge and behaviour has been highlighted through the results of this programme of research on a number of occasions. As reported in Chapter 4, the results revealed that exposure to a sexual health prime, which contained information about high rates of STIs in 2023 and encouraged condom use, did not impact sexual decision making, or even perception of STI risk, compared to general health and neutral

primes. This result would indicate that the relationship between sexual knowledge and safe sexual behaviour is not linear.

Similarly in Chapter 5, the results of the survey indicated that STI knowledge did not significantly predict scores of sexual risk. It was through the mediative effect of sexual attitudes, particularly Permissiveness and Protection, that a relationship between knowledge and risky behaviour was revealed. The model developed within this chapter indicated that STI knowledge increased scores of Permissiveness (attitudes towards a casual sexuality) and Protection (attitudes towards a shared responsibility between partners for protection). As scores of Permissiveness and Protection increased, seemingly conflictingly, so did rates of sexual risk, as measured by the Sexual Risk Survey (SRS).

As has been discussed in Chapter 5, increased knowledge may logically cause endorsement of more casual attitudes to sex, as increased knowledge may reduce fear of negative consequences of casual sex. As such, increased knowledge may increase familiarity and comfort with both the negative and positive consequences of casual sexual behaviour (Alves, 2024). Individuals with higher knowledge and better attitudes, may be less fearful of transmitting STIs, as they may be more familiar with the reality of what an STI and associated treatment entails. Familiarity with symptoms, treatment and transmission may provide individuals with a sense of confidence, either earned or unearned. The fact that exposure to information about STIs via sexual health primes did not impact STI perception may further support this idea, as the results of Chapter 4 would indicate that participants were no more concerned about STI risk following exposure to the sexual health prime, as they were following exposure to the general health or neutral primes.

Approaches to sexual health education such as abstinence only, fear-based, or biomedical approaches have been criticised in the past for multiple reasons. Abstinence-only approaches have been heavily criticised by medical and public health professionals

for ignoring the realities of adolescent sexual behaviour (Santelli et al., 2017). Abstinence-only approaches have mixed effects on rates of adolescent sexual risk, with a recent report recommending harm-reduction approaches in reducing adolescent sexual behaviour (Bhochhibhoya et al., 2024). Fear-based approaches are criticised for similar reasons; such approaches capitalise on shock and disgust by exposing young people to extreme images and anecdotal evidence concerning sexual behaviour, in an attempt to scare young people away from pre-marital sexual behaviour (Kantor, 1993). This approach fails as it does not impress upon young people a realistic representation of reality; there is also evidence to suggest that such scaremongering reduces the likelihood of engaging with a healthcare professional in the event of STI symptoms, as the young person may be too afraid and ashamed to share their condition (Wilson et al., 2012). While biomedical approaches do not necessarily promote misinformation, and can present more useful information around STIs, they have received criticism (Parker et al., 2009), including from participants in Chapter 5, for neglecting the social and emotional skills required to navigate complex sexual and romantic relationships as people enter their teenage years and young adulthood. Due to the high volume of participants who criticised their own sexual education for neglecting the more emotional aspects of sexual wellbeing, it may be possible that this conflicting relationship between knowledge, attitudes and behaviour is a result of this approach.

6.3.5 Contribution to Understanding of Sexual Decision Making

As has been identified throughout this thesis, there exists a myriad of factors which impact on sexual decision making. Rendina et al. (2018) remarked that predictive models of sexual decision making had neglected to include both state and trait variables. The model developed in Chapter 3 expanded upon this idea, and further contributed to the literature by utilising a longitudinal component to uncover more about the relationship

between sexual arousal and risky sexual behaviour. Similarly, this programme of research notes a dearth of research in the literature that combines a biomedical approach to sexual outcomes with a salutogenic approach. While a public health perspective would value a biomedical approach, as it offers insights into the spread of disease amongst young people, perspectives from young people themselves would value insights from a salutogenic approach which considers emotional regulation and communication skills required to engage in sexually fulfilling and reciprocal relationships. This piece of research has advanced understanding of sexual decision making through considering both approaches to the science. Comprehensive and predictive models of sexual decision making amongst young Irish people have been developed within this thesis. Complex patterns of decision making that occur at the intersection of attitudes, knowledge, and impulse have been identified. Factors which have received little interest in an Irish context have been explored within this thesis; for example, the immediate impact of actual public health materials on sexual decision making and perception of STI risk has heretofore not been investigated. Equally, the comprehensive model explored in Chapter 5, which addresses the disjointed relationship between STI knowledge and sexual behaviour, deepens our understanding of the interplay between the factors. The focus across this programme of study, of including sexual and gender minorities, and attempting to ensure that the models developed are tested adequately within these cohorts, also advances the science, as it has been long noted that such groups are excluded from previous relevant research.

This programme of research has contributed substantially to the understanding of the process of decision making in sexual contexts, from many perspectives. Through the use of advanced statistical techniques to investigate the factors identified above, the results of this research are reliable and have usable insights within an Irish context but are also useful to understanding sexual decision making across contexts.

6.4 Implications of findings

6.4.1 Public Health Policy

The findings of this programme of research have far reaching implications on policy for public health. The insights from Chapters 4 and 5, detailing the complex and indirect relationship between knowledge and sexual decision making have relevance for public health. While information dissemination and education are essential as part of a public health strategy for reducing the spread of STIs, as recommended in the Crowe (2023) review of the National Sexual Health Strategy (NSHS) (2015-2020) (HSE, 2025), it alone is not enough to initiate meaningful behaviour change. The findings from Chapter 4 imply that the value of public health materials is to incrementally develop the health knowledge of a population over time, rather than to immediately reroute the process of sexual decision making. The findings of Chapter 5 indicate that increasing sexual knowledge can have unintended consequences, such as improving attitudes towards a casual sexuality, which can then increase engagement in sexually risky behaviour. It is difficult to know from these findings alone what exactly the implication is on sexual health policy. Continued efforts should be made to increase knowledge of STIs, their transmission, symptoms, and treatment. Decreasing the stigma of contracting an STI is essential to encouraging the public to seek medical treatment if and when STIs are contracted.

Efforts to increase accessibility to contraception is also essential. While the recently introduced free contraception scheme for women aged 17-35 has made great advancements in the provision of sexual healthcare, it alone is unlikely to lessen the spread of STIs, only lessen the occurrence of unplanned pregnancies. The only forms of contraception provided under this scheme are primary hormonal contraception or insertable devices, such as an intrauterine device or an implant. It is also important to note that this scheme does further reinforce that the responsibility of contraception and sexual wellbeing overall belongs to

women. As reported by McConnell et al. (2021), the burden of contraception, both financial, mental and physical, often falls to women. This result has been supported by the findings of the systematic review reported in Chapter 2, which stated that the power dynamics within heterosexual relationships often dictates that women take responsibility for pregnancy prevention, and potentially by proxy, for limiting the spread of STIs between themselves and their sexual partners.

Additional efforts should be made from a public health perspective to consider actions which could support an equal responsibility for reducing the spread of STIs. While free condoms are provided in sexual health clinics and in universities, free condoms are not accessible elsewhere, such as pharmacies. Reducing the cost of condoms, even though subsidising the cost, may stand to improve sexual health outcomes, and encourage the sharing of responsibility for STI prevention within heterosexual couples.

Furthermore, the free contraception scheme does not offer any sexual health protection to most non-heterosexual couples, as pregnancy prevention is typically not a concern within such relationships. As has been noted, there exists a lack of information among gbWSW (gay and bisexual women who have sex with women) as to the specific risks they face with regard to the spread of STIs (Takemoto et al., 2019). Condoms and dental dams are of most relevance to sexual health planning to this group and are not widely accessible (Toman & Wesche, 2025). Similarly, the provision of condoms and physical barriers are essential to safe sex procedures for gay and transgender individuals. This programme of research demonstrated that such groups experience different patterns of sexual decision making as compared to heterosexual and cisgender populations. An essential step in ensuring the provision of sexual healthcare to these groups is to ensure access to STI protection.

As has been stated elsewhere in this thesis, the current political moment has brought with it increased scrutiny towards transgender individuals in particular, which also

crosses over at times to the rest of the LGBTQ+ community. There exists a distrust between transgender individuals and other queer groups at large, and public healthcare (Jaiswal, 2019; Sajwani et al., 2025), as their existence is often disputed, pathologised and weaponised as a political talking point. This distrust extends to research, as previous reports on the use of puberty blockers, such as the 'Cass Review' (Cass, 2024) has been extremely controversial within the transgender community (MacNamara et al., 2024), with a common feeling across individuals that their perspectives are not being heard or taken seriously. As such, if health outcomes are to be improved, both in sexual and other health domains, within these groups, meaningful engagement is essential. When developing public policy for the betterment of these groups, consultation of key stakeholders is of utmost priority.

This has also been supported with the results of the Crowe review (2023), which commended the NSHS 2020-2025 for its engagement with some marginalised groups, such as gay men. A key recommendation of the review is to continue engaging and providing specialised healthcare for previously identified at-risk groups, and to expand the marginalised groups to include migrants, homeless people, and older people.

Evidence of the value of effective engagement with the LGBTQ+ community is the increased availability of PEP (post-exposure prophylaxis) and PrEP (pre-exposure prophylaxis) (ECDC, 2025). This initiative has greatly improved sexual health outcomes for gay men and transgender individuals who are at risk of transmitting HIV. The dissemination of the U=U campaign has also been extremely successful in educating key groups that when the viral load of an individual previously diagnosed with HIV is undetectable through treatment with PEP, the individual is no longer able to transmit the virus (Meanley et al., 2019). As has been reported in the findings in Chapter 5, 52.8% of people knew what PEP and PrEP was, and 24.2% understood the meaning of U=U. This dissemination of information is essential in reducing the stigma of HIV and improving

sexual health outcomes of the groups most at risk of contracting this virus. This campaign has been extremely successful and demonstrates the value and efficacy of such campaigns. Furthermore, this campaign also highlights all that there is to be gained in public healthcare engaging with specific subgroups in a meaningful and non-judgemental way.

This programme of research has many implications for public sexual health policy and can stand to inform decisions for the next number of years. The Crowe review (2023) underscored the importance of integrating empirical evidence into any and all action taken to advance public sexual health policy in the country. This point has been further supported by the recently published National Sexual Health Strategy for 2025-2035 (HSE, 2025), which emphasises throughout the importance of evidence-based decisions and practice. In particular, a strong evidence base is noted in regard to the development of a Model of Care for Sexual Health, which is tasked with providing an equitable pathway for sexual health service provision.

6.4.2 Sexual Education

This programme of research has insights that are valuable to sexual education. A key finding from Chapter 5, was the extent to which young people were unsatisfied with the quality of their sexual education. The majority of participants reported qualitatively they were unhappy with their sexual education, and almost four fifths of participants reported that their sexual education was ‘Insufficient’. However, as has been explored previously, it is known that increasing knowledge may instead increase sexual risk (Alves, 2024). Participants who rated their sexual education as ‘Insufficient’ displayed higher rates of STI knowledge, compared to those who hadn’t received formal sexual education and those who felt their education was sufficient. This result may provide some valuable insight to sexual education; perhaps those who rated their education as insufficient were propelled to learn more about sexual health and behaviour for that reason. While this generally may not be desirable as there is no guarantee that the information available to

young people via informal routes is reliable or factual, it may be worth noting that encouraging young people to take their education into their own hands is a more beneficial approach, rather than favouring an education that is prescriptive and aimed ‘at’ young people rather than ‘for’ them.

Another important finding from Chapter 5, is that the aspect of formal and informal sexual education that was most predictive of adult sexual risk behaviour, was the age at which a person first had a conversation with a parent or guardian about sex or relationships. Therefore, supporting parents with tools and additional information to enable them to initiate conversations early in their children’s lives, can help support the sexual education and health of young people. Previous research (Zhang & Yuan, 2023) has reported that parents who experience shame regarding their sexual behaviour and who feel they are not knowledgeable enough will tend to avoid initiating conversations about sexual health. Targeted interventions for parents may help empower them to support the sexual development of their children, as they move from childhood to adolescence.

Perhaps the most pertinent insight for sexual education is the complicated impact of sexual knowledge on sexual risk behaviour. Both the recommendations from the young people consulted in the review of the Relationships and Sexuality (RSE) programme (NCCA, 2019), and the findings from this programme of research underscore the importance of the social and emotional factors needed to engage in sexual and romantic relationships. Some participants from the survey in Chapter 5 cited a determined focus on biological processes and reproduction present in their sexual education, which neglected other aspects of sexual relationships, such as pleasure and emotional wellbeing. Some did note the utility of a biological approach, but most participants that reported a biological focus commented on the limitations of this approach. The results from the same participants revealed that higher STI knowledge led to higher sexual risk, as mediated by sexual attitudes. It stands to reason that perhaps the biological focus of their education,

which has equipped them with facts about STIs and their transmission and has neglected social and emotional aspects of sexual relationships, has produced this complex relationship between knowledge and behaviour. Perhaps by integrating the development of social and emotional skills into formal sexual education, an improvement in sexual health outcomes may be possible.

6.5 Sexual and Gender Minorities

Previous literature had noted gaps in knowledge relating to sexual health and associated decision making amongst sexual and gender minorities (Költo et al., 2021; Blondeel et al., 2016). It has also been noted that this group made up of relatively distinct identities, whilst often treated as a homogenous group, experience vast differences in sexual outcomes. Some research has been conducted relating to the sexual decision making of gay and bisexual men (Rendina et al., 2018; Jones et al., 2018; Gebru et al., 2024). However less was known about the sexual experiences of bisexual and lesbian women (Takemoto et al., 2019), and gender minorities such as transmen and women, and non-binary people. A key aim of the current research was to ensure that the models developed within this programme of research were at least tested amongst sexual and gender minorities, ideally to ensure they extend to include the experiences of sexual and gender minorities.

While the results from this programme of research relating to sexual and gender minorities should be interpreted cautiously, there is some evidence to suggest that the overall process of sexual decision making is largely the same across populations. For example, Chapter 3 identified the salience of self-hate (captured by the Self-Criticism and Self Reassurance Scale) in sexually risky behaviour across all participants. Findings from this chapter indicated that those who scored highly in self-hate engaged in more risky sexual behaviour, but also indicated that sexual and gender minorities were more likely to have higher rates of self-hate. The reasons for this have been explored in Chapter 3, and

may include self-stigma or stigma from wider society. Other patterns of behaviour are similar but more exaggerated amongst gender minorities in particular. Gender minority status significantly moderated the relationship between STI knowledge and sexual risk, meaning the positive relationship between STI knowledge and sexual risk was especially strong amongst gender minorities. Similarly, gender minority status acted as a significant moderator between Instrumentality (a subscale of sexual attitudes relating to the biological function of sex) and sexual risk. Amongst the entire sample, there was a positive but non-significant relationship between Instrumentality and sexual risk. This relationship was significant amongst gender minorities, indicating gender minority identity amplifies the relationship between aspects of sexual attitudes and sexual risk.

However, there are differences between the sexual risk behaviour of the general population and sexual and gender minorities that need to be acknowledged in health and education. For example, a major difference between heterosexual-cisgender populations and sexual minorities specifically is the role of SCSE. Findings from Chapter 5 indicate that typically, high SCSE scores lead to lower rates of sexual risk. This pattern is seemingly reversed amongst sexual minorities, such that high SCSE scores are associated with higher scores of sexual risk. A similar case was seen with Communion, whereby amongst gender minorities, the relationship between Communion and sexual risk is reversed, such that there is a positive relationship between Communion and sexual risk.

However, there are associated challenges in focusing on this cohort. There were not enough sexual and gender minorities recruited to the experiment in Chapter 4 to facilitate further analysis between groups. This leads on to the next prescient point relating to sexual and gender minorities: recruitment of these groups was a consistent difficulty throughout this programme of research. This may speak to the wider context of the experiences of LGBTQ+ people at the moment, particularly transgender people, as this community has come under heavy scrutiny in recent years. There has been in recent times a heightened

awareness and often volatile public discussion around queer people, which has at times descended into conversations around their sexual deviancy. As has been explored in previous chapters, the difficulty in recruitment of these populations may indicate a reluctance to engage with wider institutions, including health and academia, as a result of these issues. Therefore, it has been difficult to come to any clear conclusions regarding differences between the sexual decision making between heterosexual, cisgender populations and queer and gender non-conforming participants.

The first empirical paper in this thesis dichotomised participants as either heterosexual and cisgender, or LGBTQ+, as a result of the difficulty of recruitment, and so that comparisons could still be made between groups. Later studies did not dichotomise participants in such an extreme way, where sexual and gender minorities were collapsed into the same variable. However, the approach that was taken was limited, due to low sample sizes across the groups. Sexual minority status and gender minority status were still represented by only one binary coded variable each, which is still recommended against in the literature. This is due to a concern in the existing literature that dichotomising this variable reduces nuance and neglects the opportunity to explore differences between sub cohorts in LGBTQ+ participants (Taggart et al., 2019). However, representing this information in this way did facilitate further analysis, particularly in Chapter 5, to look at variances between sexual and gender minorities, and heterosexual, cisgender populations. Despite the low group sizes amongst sexual and gender minorities, further analysis that could address key research questions was made possible by dichotomising gender and sexual minorities. As has been done throughout this programme of research, it is important to caveat that the way sexual and gender minority groups have been represented in this research may obscure some of the nuance and complexities between individuals. The inclusion of sexual and gender minorities represents a great strength of this research, but the restrictions of recruitment and analysis represent a limitation.

A recurring issue in the literature is the dearth of findings relating to the sexual decision making of sexual and gender minorities. It is also difficult to make concrete observations about sexual decision making within this cohort based on this programme of research, due to the range of limitations encountered in the analysis of this cohort. It is certainly apparent that there are differences between the sexual decision making of sexual and gender minorities and heterosexual-cisgender populations. In some cases, such as that of self-hate and STI knowledge, minority identity augments a phenomenon occurring in heterosexual-cisgender populations, potentially due to harsher social environments for queer people and the associated repercussions from that. As such, it is essential to include perspectives from gender and sexual minorities when developing public health policy or sexual education. Particularly in the context of public health policy, these findings would indicate the need for specialised interventions for dealing with specific groups within sexual and gender minorities, as there will be associated complexities in targeting specific groups. Consultation with stakeholders will also be imperative, in order to ensure the efficacy of interventions.

Furthermore, future research should attempt to identify specific groups within sexual and gender minorities for whom sexual decision making is more complex. It is unlikely that sexual decision making is homogenous across each sexual and gender identity. Further insight into which specific groups are pushing the significant findings reported in this thesis will be valuable to sexual health policy in developing more targeted, and therefore, more effective interventions.

6.6 Study Design

Each empirical study within this programme of research utilised a different study design. This brought with it challenges and learnings unique to each design. This section is a reflection of the designs used.

6.6.1 Longitudinal Design.

A longitudinal component was used in the study reported in Chapter 3. This component was included through the use of daily diaries, which asked participants each day to detail their level of sexual arousal across three measures, and their engagement in risky sexual behaviour. The value of this design was that it offered additional insights into the relationship between sexual arousal and sexual risk. This component was utilised in line with recommendations from previous research (Rendina et al., 2018; Mustanski, 2007), that suggested that arousal is a complex and dynamic variable that cannot be accurately captured by one time point. However, through comparing the initial measure of sexual arousal with the scores of sexual arousal across the following 29 days, it was identified in the results of Chapter 3 that the initial measure was very highly correlated with later measures. As such, the initial measurement of sexual arousal acted as a proxy when included in further analysis in Chapter 3.

While this longitudinal component was added in order to explore a more nuanced relationship between risky sexual behaviour and sexual arousal, data analysis on this relationship was limited. This was due to the high attrition in this study, presumably due to the additional burden of completing the daily diaries across 29 days following the initial battery. While incentives were used, in the form of participants being entered into a draw for a voucher, this was not incentive enough to remain invested in completing the study. Perhaps a face-to-face meeting between participants and the PhD researcher would have increased engagement with the study, as participants would have been able to personalise the research. Additionally, a greater incentive also probably would have been useful, in order to retain participants in the study.

Furthermore, recruitment was extremely difficult for this study. This was potentially due in part again, to the study design and the time investment required to complete the study. This was the only empirical study in this programme of research that

did not involve stakeholders. Perhaps this reduced the credibility of the study, and as such potential participants were not motivated to take part.

Building in longitudinal components to sexual health research can also present a significant challenge. This study had the expertise and help of staff from the School of Computing, and their software to aid in producing a longitudinal component. Without their help, both in the software used to collect the data and their skills in analysing the longitudinal data across timepoints, this design would not have been possible in the study, due to the extensive upskilling required.

6.6.2 Cross-sectional Designs

Cross-sectional components were utilised across this programme of research, in Chapters 3 and 5. These aspects were considerably easier to recruit for, as a link to Qualtrics can be shared via social media and email. As such, it is easier to get much higher numbers of participants for these types of studies. For example, in Chapter 5 there were 269 participants retained in the final analysis, compared to 69 in Chapter 4, which utilised a purely experimental design. Recruitment with these designs can be slow and time consuming however, as you are often relying on participants to become invested in the research remotely and without direct contact from the PhD researcher. Without stakeholders involved to access specific groups for recruitment, it can pose a significant issue.

Cross-sectional studies overall were the easiest designs to develop and run. The cross-sectional components used in this programme of research were designed and composed over Qualtrics.

6.6.3 Experimental Designs

Chapter 4 utilised experimental measures, in the form of a priming laboratory-based experiment. This component brought some difficulty in recruitment, as it can be difficult to

encourage participants to commit to completing the experiment, either in terms of time or effort. It would have been more desirable to use incentives to encourage recruitment. However, a benefit of the study design as it was utilised in Chapter 4, was that attrition was not an issue. Once participants committed to coming into the laboratory to complete the study, and arrived at the laboratory, I could collect their data in its entirety, so there was no risk of attrition. I also recruited participants in person a lot more for this study and communicated directly with participants via email with a study specific email address. Both of these components likely invested participants into the research more, and as such were more inclined to participate in the study. A major drawback of this design compared to a survey-based design, is that I only had the resources to collect data from 5 participants at any one time. Given that there were also limitations on the time I had to conduct this piece of research, this presented itself as an issue.

6.7 Future Research

Following the results from Chapters 4 and 5, it is evident that there is a relationship between sexual attitudes, knowledge, and behaviour. An essential next step for future research is to identify the nature of the relationship between these variables and identify the direction of this relationship. That is, to identify, as proposed by Alves (2024) whether individuals who engage in high-risk sexual behaviour seek out more sexual information, or whether those with more sexual knowledge are more emboldened to increase their sexual risk. Given the finding in this thesis that attitudes mediate the relationship between knowledge and behaviour, understanding what role attitudes play in this complex interplay of factors is also essential. This information is invaluable to interventions that target sexually risky behaviour, as it will provide valuable insight into what exactly drives the increase in sexually risky behaviour. For example, if it is found that higher knowledge does result in higher risky behaviour, it may be the case that knowledge building interventions

provide their target audience with additional information to combat the increase in risky behaviour.

Future research should also identify whether a more salutogenic approach in sexual education may produce different sexual health outcomes. This thesis has outlined the shortcomings, both anecdotally from participants and empirically, of a disease-based approach to sexual education. While a disease model of health has its value, it has been demonstrated in this body of work that increased knowledge may not decrease risk behaviour and may instead actually increase engagement in risk. What is largely unknown in an Irish context, is if a salutogenic approach would better suit the educational needs of young Irish people. That is, would a programme of sexual health education that concretely targets improving emotional regulation and sexual communication skills, that also combines information about the risks and benefits of sexual behaviour, would instil more sexually protective behaviour amongst young people. This approach, combined with improved sexual healthcare, such as increased access to protective barriers and contraception, and a more inclusive sexual health policy, may serve to position the Irish public to make safer sexual decisions.

There is scope for future research to explore cross-cultural differences and similarities in sexual risk and its determinants. As was noted in Chapter 5, it is difficult to draw conclusions about the significance of scores of STI knowledge and sexual risk in an Irish cohort, due to the lack of standardised measurements and comparable results in other samples. The development and identification of standardised measures of STI risk behaviour, knowledge and other related factors can produce results that are comparable to other populations, such as that from America and Europe, which can stand to produce meaningful results on the impact of culture on sexual risk and its determinants.

A key recommendation from this programme of research is that future research which includes LGBTQ+ individuals in any capacity, should seek to over recruit from this

population, so that within-group differences can be explored fully. Sexual and gender minorities are diverse in terms of their behaviour, and the variables that motivate their behaviour. In order for this to be achieved, a robust and incisive strategy for recruitment is required. Over recruitment can help to prevent such a complex cluster of identities being treated as a homogenous group and can also help to reduce tokenistic inclusion. In order to achieve this type of recruitment, a robust strategy for recruitment will be essential. Consultation with LGBTQ+ individuals or organisations should be sought, in order to guide the research and its design. This can increase participant investment in the project, as it will actually stand to meet the needs of this group. Engagement with stakeholders and representatives can also stand to increase trust between this community and researchers who are interested in an unbiased exploration of LGBTQ+ experiences and the issues that affect their behaviour. Leveraging stakeholder networks to aid in recruitment will help to ensure that the research is promoted to its target sample. Consultation with representatives and stakeholders during the write up process could also stand to increase trust, as it provides experts with a chance to advise the project on correct terminology and avoid problematic framing of behaviours.

While an undeniable strength of this research was the concerted effort to include gender and sexual minorities, future research should also seek to diversify samples. The Crowe (2023) review of the NSHS identified that alongside gay and bisexual men and young people, migrants and sex workers are at increased risk of transmitting STIs. Future research should attempt to engage with these individuals, in order to identify how sexual decisions are made amongst groups with vulnerabilities and barriers to accessing sexual healthcare.

6.8 Strengths and Limitations of this Programme of Research

6.8.1 Strengths

An undeniable strength of this research is its novelty. At the outset of this programme of research, a gap in the literature was identified. Following the Covid-19 pandemic, rates of STIs were rising, both in Ireland and further afield in Europe, with very little research being conducted to explain it. This programme of research was developed in order to fill that gap in the literature, to produce results that inform policy both in health and education. This research combines complex experimental design and statistical techniques, with insights from previous research which identified pertinent factors in sexual decision making. This combination produces an innovative and novel piece of research. To the author's knowledge, the likes of the experiment conducted in Chapter 4 has not been conducted before in Irish context; specifically, sexual discounting and sexual vignettes have not been used to quantify sexual decision making in an Irish populace. As such, the way in which this research has advanced the experimental science of sexual decision-making stands as a remarkable strength of this programme of research.

The consultation of key stakeholders is an essential strength of this research. The input from experts in this thesis ensured the relevancy of study aims to the wider context of sexual decision making, in the areas of public health and education. The input from these individuals also ensured the validity of materials. Where stakeholders directly provided materials for the research, as in the case of Chapter 4, the results provided invaluable insights into the efficacy of public health materials in sexual decision making. Collaboration with key stakeholders was essential to the success of this research.

6.8.2 Limitations

The primary limitation of this programme of research was that stakeholders and experts in the area of sexual and gender minorities were not consulted early enough in the

research process. The consequence of this was the recruitment difficulties in Chapter 3. While this was corrected from Chapter 4 onwards, it would have strengthened the research, particularly in the area of recruitment, if stakeholders had been involved from as early on in the research as possible.

The sample size was a limitation in this programme of research, considering the complexity of analysis across the three empirical chapters. On a number of occasions throughout the thesis, alternate analyses were conducted in place of the planned analysis, as a result of low sample sizes. Small sample sizes of sexual and gender minorities, as has been explored previously, was also a significant limitation of this research.

6.9 Conclusion

Sexual decision making is a complex process, distinct from decision making in other domains, and impacted by a range of factors. To this researcher's knowledge, this programme of research is the first in an Irish context to explore a vast range of factors impacting sexual decision making. From the outset, this thesis sought to combine a biomedical approach to sexual health behaviour with a salutogenic approach, in order to develop a rounded model of sexual health behaviour. There are several implications for policy and education arising from this thesis. The findings of this research can be used to advance public health policy in Ireland, as efforts continue to reduce the spread of STIs. Similarly, this research stands to inform the changes to be made to the Relationships and Sexuality Education programme, in order to fit the programme of education to the current needs of children and teenagers. Future research should seek to solidify understanding of the relationship between knowledge, attitudes, and behaviours. Sexual health research involving diverse samples are also essential in advancing our understanding of how vulnerable and at-risk groups make decisions about their sexual behaviour, and how they access sexual healthcare. This programme of research has provided novel and valuable

research that deepens our current understanding of sexual decision making amongst young people, both in Ireland and further afield.

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Appendix A. Search Terms

“sexual behavio*” OR “risky sexual behavio*”OR “sexual risk*” OR HPV OR HIV OR “acquired immunodeficiency syndrome” OR “sexually transmitted diseases” OR “sexually transmitted infections” OR syphilis OR gonorrhoea OR trichomoniasis OR chlamydia OR gonorrhoea OR “genital warts” OR “genital herpes” OR “pubic lice” OR scabies

discount* OR gambl* OR decision OR choice OR “response inhibition” OR “risk taking” OR “risk-taking” OR “risk perception”

task OR manipulat* OR experiment* OR paradigm OR game OR dilemma

Appendix B. Inclusion and Exclusion Criteria.

Inclusion Criteria

- Decision-making must be measured. Papers may be included where the measures are not specifically related to sexual decision making, but are measuring decision making in some capacity and are being used by researchers to uncover the processes underpinning sexual decision making.
    - In the event sexual decision making specifically is not being measured, some other component of sexual behaviour must be measured alongside decision making
    - Other components of sexual behaviour can include measures of sexual risk or sexual impulsivity, self-reported sexual behaviour, sexual sensation seeking, sexual history questions, etc.
- Decision making must be an outcome measure using an experimental design, such that there must be manipulation of an independent variable
- Decision-making must be in a non-professional capacity; that is, it is a decision being made by a layperson about their own health, not a decision being made by a professional about the health of their patients/clients/constituents. Participants also may not be sex workers.
- Methodology of the paper must be quantitative – mixed methods is acceptable
- Participants in the papers to be included must between the ages of 18-30
- Papers must be non-clinical, that is, must not have a condition that will significantly impair their decision making abilities, such as ADHD, Borderline personality disorder, addiction, etc.
- Papers must be empirical
- Participants must be sober whilst participating in the study, that is, they must not be under the influence of any drugs or alcohol. Papers may be included where there is

a control group that experiences the same experimental conditions as other groups but is not under the influence of drugs or alcohol.

- Type of sexual behaviour being studied must be within the scope of consensual sexual behaviour

Exclusion Criteria

1. ***Wrong Paper***

- If paper is not reporting empirical research

2. ***Wrong population***

- If participants are under the age of 18, over the age of 30, or if age is not reported.
    - If age range is not reported, mean age can be no higher than 25 years of age
- If study is focused on a clinical population with a condition that significantly impacts their decision-making, such as ADHD, Borderline personality disorder, etc.
- If participants are under the influence of drugs and/or alcohol, or believe that they may be(placebo, with no control group)

3. ***Wrong sexual behaviour***

- Not measuring sexual health/behaviour
- If the type of sexual behaviour being studied is operating in the absence of consent, e.g. paedophilic sexual tendencies, date rape, coercive sexual behaviour, etc.

4. ***Wrong Decision Making***

- If clear from the paper that the decision making that was measured was in a professional capacity, i.e. decisions that were made by professionals relating to the health of their patients/clients/constituents
- Not measuring decision making

5. Wrong Study Design

- If there is no experimental manipulation, that is, some independent variable is not being manipulated
- If an outcome measure is not decision making
- If its explicitly stated that the methodology was exclusively qualitative with no quantitative component whatsoever

Appendix C. Quality Assessment.

Table C.
Quality assessment scoring of each paper.

Criteria	Berry et al. (2019)	Cheng & Chiou (2018)	Collado et al. (2016)	Collado et al. (2017)	Czopp et al. (2004)	Dariotis & Johnson (2015)	Davis et al. (2010)	Ebel- Lam et al. (2009)	Finkelstein & Brannick (2000)	Gagnon & Godin (2000)	Gebru et al. (2024)
1. Clearly stated aims	P	P	P	Y	Y	Y	P	Y	P	P	Y
2. Participant eligibility and recruitment strategy clearly documented	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3. Main features of population/ design described	Y	Y	Y	Y	Y	Y	Y	Y	P	P	Y

4. Non-responders (and non-participants) described	Y	N	N	Y	N	Y	Y	N	N	N	P
5. Presence of a control group	N	Y	P	N	N	N	Y	Y	N	N	N
6. Main limitations identified and acceptable	Y	Y	Y	Y	Y	Y	Y	P	P	Y	Y
7. Sample size justified	N	N	N	N	N	N	N	N	N	N	Y
8. No evidence of selective reporting of results	Y	Y	Y	Y	Y	Y	Y	P	P	Y	Y

9. Statistical methods described	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
10. Statistical methods appropriate	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
11. Measures relevant, validated and described adequately	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
12. Results discussed adequately	Y	Y	P	Y	Y	Y	Y	P	Y	Y	Y
Total Score	19	19	17	20	18	20	21	17	15	16	21

Criteria	Gebru & Wongsom-boon (2024)	Granados et al. (2020)	Harsin et al. (2021)	Hennessy et al. (2007)	Hoefnagels et al. (2006)	Jones et al. (2018)	Lawyer & Mahoney (2018)	Lemley et al. (2017)	Lemley et al. (2018)	Lui & Hsu (2018)
1. Clearly stated aims	Y	Y	Y	Y	Y	Y	P	P	P	Y
2. Participant eligibility and recruitment strategy clearly documented	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3. Main features of population/ design described	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4. Non-responders (and non-participants) described	Y	P	N	Y	Y	N	P	Y	Y	N
5. Presence of a control group	N	N	Y	N	N	N	Y	N	N	Y

6. Main limitations identified and acceptable	Y	Y	Y	P	P	P	N	Y	Y	Y
7. Sample size justified	N	N	N	N	N	N	Y	N	N	N
8. No evidence of selective reporting of results	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
9. Statistical methods described	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
10. Statistical methods appropriate	Y	P	Y	Y	Y	Y	Y	Y	Y	Y
11. Measures relevant, validated and	Y	P	Y	Y	Y	Y	Y	Y	Y	Y

described adequately										
12. Results discussed adequately	Y	Y	Y	Y	P	Y	Y	Y	Y	Y
Total Score	20	17	20	19	18	17	18	19	19	20

Criteria	**Macapagal (2017)**	**MacDonald & Fong (2000)**	**MacDonald & Martineau (2002)**	**Mitzel et al. (2023)**	**Negash et al. (2016)**	**Reyna et al. (2011)**	**Reynolds et al. (2019)**	**Ross & Bowen (2010)**	**Rupp et al. (2009)**	**Sen (2004)**
1. Clearly stated aims	Y	P	Y	Y	Y	Y	Y	P	P	P
2. Participant eligibility and recruitment strategy clearly documented	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
3. Main features of population/	P	P	Y	Y	P	Y	Y	Y	Y	P

design described										
4. Non-responders (and non-participants) described	Y	Y	N	Y	Y	N	Y	Y	N	N
5. Presence of a control group	N	Y	N	N	Y	N	N	N	N	P
6. Main limitations identified and acceptable	Y	P	Y	Y	P	P	Y	Y	N	N
7. Sample size justified	N	N	N	N	N	N	N	N	N	N
8. No evidence of selective reporting of results	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
9. Statistical methods described	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

10. Statistical methods appropriate	Y	P	Y	Y	Y	Y	Y	Y	Y	Y
11. Measures relevant, validated and described adequately	P	Y	Y	Y	P	Y	Y	Y	P	Y
12. Results discussed adequately	Y	P	Y	Y	Y	Y	Y	Y	P	Y
Total Score	18	17	18	20	19	17	20	19	11	15

Criteria	Sheinfil & Woolfe-King (2022)	Skakoon-Sparling & Cramer (2015)	Skakoon-Sparling & Cramer (2021)	Skakoon-Sparling & Milhausen (2021)	Sweeney et al. (2020)	Tayler et al. (2009)	Van Der Bergh & Dewitte (2006)	Walters et al. (2022)	Wolfs et al. (2019)	Young & Jordan (2013)
1. Clearly stated aims	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2. Participant eligibility and recruitment strategy clearly documented	Y	Y	Y	Y	Y	Y	Y	Y	Y	P
3. Main features of population/ design described	Y	Y	Y	Y	Y	Y	Y	Y	Y	P
4. Non-responders (and non-participants) described	N	P	Y	N	Y	N	N	Y	Y	N

5. Presence of a control group	N	N	Y	Y	N	N	Y	Y	Y	Y
6. Main limitations identified and acceptable	Y	Y	P	Y	Y	Y	N	Y	Y	P
7. Sample size justified	Y	N	Y	N	Y	N	N	Y	N	N
8. No evidence of selective reporting of results	Y	Y	Y	Y	Y	Y	Y	Y	Y	P
9. Statistical methods described	Y	Y	Y	Y	Y	Y	P	Y	Y	P
10. Statistical methods appropriate	Y	Y	Y	Y	Y	Y	Y	Y	Y	P
11. Measures relevant,	Y	P	Y	Y	Y	Y	P	Y	Y	N

validated and described adequately										
12. Results discussed adequately	Y	Y	Y	Y	Y	Y	Y	Y	Y	P
Total Score	20	18	23	20	22	18	16	24	22	11

Appendix D. Recruitment Poster



Appendix E. Plain Language Statement

Investigating Moderating Factors on the Relationship between Decision Making and Risky Sexual Behaviour

Shauna Glennon
Student Researcher
School of Psychology

Dr Sinéad Smyth
Associate Professor
School of Psychology

Dr Catherine Fassbender
Assistant Professor
School of Psychology

Introduction

You are invited to participate in a research project which is being completed by Shauna Glennon as part of her Masters of Research in DCU. The project is supervised by Dr Sinéad Smyth and Dr Catherine Fassbender of the School of Psychology at DCU. Ethical approval for the study was granted by the Research Ethics Committee. The aim of the study is to understand how a variety of factors, such as fatigue, emotional affect, and sexual arousal impact on the relationship between decision making (as measured by a questionnaire related to monetary rewards) and risky sexual behaviour.

What Will I Be Asked to Do?

Should you agree to participate, you will be asked to download an app onto your phone which will collect data related to this study over the next 30 days. Once you have set up your account on the app, you will have access to the study. Firstly, you will be asked about your age, gender identity, and sexual orientation. You will then be asked to complete a series of questionnaires that will ask you about your levels of fatigue, emotional affect and decision making related to monetary rewards. You will also be asked a series of questions about your sexual behaviour and levels of sexual arousal over the past 24 hours. Completing these questionnaires may take anywhere up to 20-30 minutes. Furthermore, should you consent to take part in this study, you will be asked to complete a daily journal over the next 30 days, detailing your sexual behaviour and levels of sexual arousal that you have experienced over the previous 24-hour period. Please note that in order to take part, participants should have fluent English.

It is also important to note that participants who answer 85% of the daily diaries (25 diaries) will be entered into a draw for a €50 gift voucher. Any participants who answer less than 25 of the daily diaries will not be entered into the draw. The winning participant will be notified via email of their winnings within approximately 2 months after they have completed the study.

How Will My Anonymity and Confidentiality Be Protected?

We intend to protect your anonymity and the confidentiality of your responses to the fullest possible extent. Should you agree to take part in the study, your email address will be required in order to send you instructions on how to download AthenaCX, the app that will be used to collect your data over the next 30 days. Your email address will be stored in a password protected encrypted file on Google Drive, and will not be stored with any of your other data that will be collected over the course of this study. Your data will only be shared amongst the researchers named on this project. Your email address will be deleted following your completion of the study. The results of this study will be reported in the final thesis which will be submitted in Spring 2024. The results may also be presented at conferences or in peer-reviewed journals. The data will be

stored for up to five years in the event that the manuscript is publishable, after which point it will be destroyed.

All possible precautions will be taken to ensure your confidentiality will be protected. However, it should be noted that data can only be protected within the limitations of the law, and if any legally incriminating data were to arise that the researcher will have to act in line with legal protocols.

How Will I Receive Feedback?

Once the study has been completed and the report has been written up and submitted, participants can contact the researcher, who can send the participant a summary of the results. Individual results will not be made available, only the results of the study as a whole.

Are There Any Benefits or Risks in this Study?

The results from this study will inform a series of studies that will be completed throughout this programme of research. The overall aim of this research is to develop our understanding of the relationship between decision making and risky sexual behaviour, particularly in populations that have heretofore received little attention, such as sexual minorities. The results from these studies will help inform a model of decision making in a sexual health context, and will help inform public policy, particularly in areas of public health. This research could also stand to inform sex education. There is a risk that some of the material in the study may make you feel distressed or upset. There is also a chance that you may feel the information that you are being asked to share is too sensitive. In that event, you are free to stop the experiment immediately, withdraw all data, and leave, without explanation or judgement.

There is also a small risk that the safety of your data may be compromised in the event of a data breach. However, all possible steps to protect your data will be taken by the researcher to ensure that your confidentiality is protected to the highest extent. Your email addresses will be stored separately from the rest of your data, which mitigates the risk that you would be identifiable from your data.

Do I Have to Take Part?

Participation in this study is voluntary. You are free to withdraw at any stage before submitting the final diary entry, should you wish to do so. It is important to note that some of the questions that you will be asked during this study are of a personal nature, and will ask you to disclose information relating to your sexual behaviour. Should you find this uncomfortable you are free to not take part in this research. Should you find during the process of data collection that you feel uncomfortable and wish to withdraw from the study, you are also free to do so. You can withdraw from the study by deleting all of the data which you have submitted off the app, which will be explained to you in more detail at a later stage. Your decision to participate or not, or to withdraw all of your data, is completely your own, and there will be no repercussions for your decisions. However, once you submit the final diary entry, you will no longer be able to withdraw your data, as the email addresses will then be deleted, and the researchers will not be able to track which data is yours.

How Do I Agree to Participate?

If you would like to participate, please indicate that you have read and understand these terms by completing the consent form provided and clicking ‘Continue’. You will then be brought to the next stage of the study.

Where Can I Get Further Information?

If you wish to read a summary of the results of this research project or have any other questions or concerns, please contact the student researcher, Shauna Glennon (decision.making@dcu.ie).

Alternatively, if you have any concerns about the study, regarding any of the information provided above, you can contact either one of the supervisors on this study, either Dr Sinéad Smyth (sinead.smyth@dcu.ie), or Dr Catherine Fassbender (catherine.fassbender@dcu.ie).

DCU Counselling Services

Email Address: dcustudents@inspirewellbeing.ie

Telephone No.: 1800 816 938

Website: dcu.ie/counselling

Samaritans

Email address: jo@samaritans.ie

Telephone No.: 116 223

In the event you require further information or supports relating to your sexual health or wellbeing, here are some resources which may help

HSE Sexual Wellbeing
Website: Sexualwellbeing.ie
Twitter: @_respectprotect
Sexual health and Crisis Pregnancy Programme Telephone No.: 01-7959130

LGBT Ireland – Sexual Health for LGBT+ People
Website: Lgbt.ie
Email: info@lgbt.ie
Telephone No.: 1800 929 539

If participants have concerns about this study and wish to contact an independent person, please contact:
The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000, e-mail rec@dcu.ie

Appendix F. Consent Form

Please complete the following consent form by ticking either 'Yes/No' for each question

I voluntarily agree to participate in this research study and acknowledge that I have not been coerced.

Yes □

No □

I understand that if I agree to participate now, I can withdraw my data from this research up until I submit my final diary entry in 30 days' time, as after this point, my data will no longer be identifiable from any other participant.

Yes □

No □

I understand that I can withdraw permission for my data to be used before I submit my final diary entry to the experimenters. However, I am also aware that once this final diary entry has been submitted, I cannot withdraw it as it will be non-identifiable from other participants in the study.

Yes □

No □

I understand that in order to take part in this study, I must download an app. I understand that I will receive instructions on how to download the app and set up my account via email

Yes □

No □

I understand that in order to be entered into the draw for a €50 gift voucher, I must complete a minimum of 25 of the daily diaries

Yes □

No □

I read the Plain Language Statement or have had it read to me. I understand the Plain Language Statement.

Yes □

No □

I have been given an opportunity to ask any questions that I may have, and I am happy with responses that I have been given.

Yes □

No □

I understand what participation in this study involves, and how my data will be used. I understand that I will be able to avail of a summary of the findings of the study by contacting the researcher.

Yes □

No □

I understand that while I will be providing my email address as part of this study, this information will be stored separately from the rest of my data, and that the rest of my data will remain anonymous. I also understand that my email address will be deleted once I have submitted my final diary entry.

Yes □

No □

Last updated September 2014

I understand that my data will be stored until the thesis is submitted and could still be stored up until 5 years after the thesis has been submitted

Yes □

No □

I understand that I am free to contact the researcher and I have been given contact information of the researcher should I wish to.

Yes □

No □

I understand that there are legal limitations to my data; my information can only be protected within the limitations of the law and if I disclose any legally incriminating data, legal protocol will be assumed

Yes □

No □

I can confirm that I am 18 years of age or older

Yes □

No □

Signature (Virtual): _____

For matters related to GDPR compliance the Data Controller is DCU and the DCU Data Protection Officer is Mr. Martin Ward, contactable on 01-700.5118 / 01-700.8257 or at data.protection@dcu.ie. You have the right to lodge a complaint with the Irish Data Protection Commission if you feel your data has been mishandled.

Appendix G. Instruction Email

Dear Participant,

****Please read below for instructions on how to complete the next phase of this study****

Thank you very much for agreeing to take part in this study, I appreciate your support and participation in my research thus far.

You have just completed Phase 1 of the research. You are now being asked to complete Phase 2 of the study, which consists of answering a daily diary for 29 days on your levels of sexual behaviour and arousal. This email will give you instructions as to how to download the app, AthenaCX, where you will be inputting your data over the next month.

How to download AthenaCX:
1. Download AthenaCX on the Apple Store or on Google Play
2. Go into the app once downloaded
3. Click the option icon in the top left corner
4. Press 'join closed study'
5. Type in your participant ID, **which is 'participant_x'**
7. You are now logged onto the study, and will receive the first diary to complete at 8pm. You will be reminded at 8am the following morning to complete the daily diary for that 24 hour period, and the diary will be taken offline at 10am. The next diary will then be made available at 8pm, and so on.

Please remember that participants who complete 25 daily diaries will be entered into a draw to win a One4All voucher!

In the event that you wish to withdraw from the study, if you swipe left on the study on the homepage of AthenaCX, you will be provided with two options, 'Delete data' or 'Unenroll'.
- If you choose the 'Delete data' option, it will ask for your ID, and will then delete all of the data that you have submitted up until that point
- If you choose 'Unenroll' it will stop notifications from being sent to your phone from the app, but will not delete your data (so the data that had been collected up until that point can still be used in the study). If you choose this option, but decide that you would like your data to be deleted after the fact, you can get in touch with the study email here (decision.making@dcu.ie) and we can do it for you.

N.B. If you have an Android phone, please take note of the following.
If you have an Android phone, you may not be able to receive notifications from the AthenaCX app, if you have Battery Optimization turned on your phone. Please turn this setting off for the length of this study, as it is important that you can receive notifications from AthenaCX. If you need more information on how to turn off this setting on your phone, please reply to this email.

Please note again that you can only withdraw for the 29 days that the daily diaries are being run for, as after this, your email addresses will be deleted and your data will not be identifiable from anyone else's.

If you have any other questions or are experiencing any problems, please reply to this email. If you are not receiving notifications from the AthenaCX app, please get in touch with this email address and let us know.

Thanks again for agreeing to take part in the research.

Best wishes,
Shauna Glennon

Appendix H. REC Approval Letter

Ollscoil Chathair Bhaile Átha Cliath
Dublin City University

DCU

Shauna Glennon
School of Psychology

Dr. Sinead Smyth
School of Psychology

13th December 2021

REC Reference: **DCUREC/2021/245**

Proposal Title: **Developing a new model of decision making to explore factors impacting risky sexual behaviour**

Applicant(s): **Shauna Glennon, Dr. Sinead Smyth, and Dr. Catherine Fassbender**

Dear Colleagues,

Thank you for your application to DCU Research Ethics Committee (REC). Further to full committee review, DCU REC are pleased to issue approval for this research proposal.

DCU REC's consideration of all ethics applications are dependent upon the information supplied by the researcher. This information is expected to be truthful and accurate. Researchers are responsible for ensuring that their research is carried out in accordance with the information provided in their ethics application.

Materials used to recruit participants should note that ethical approval for this project has been obtained from the Dublin City University Research Ethics Committee. As part of DCU REC's ongoing monitoring process, during your research you may be asked to provide DCU REC with a progress report. Should substantial modifications to the research protocol be required at a later stage, a further amendment submission should be made to the REC.

Yours sincerely,

Dr. Melrona Kirrane

Dr. Melrona Kirrane
Chairperson
DCU Research Ethics Committee

DCU
Research & Innovation

Taighde & Nuálaíocht Tacaíocht
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Appendix I. Images from Sexual Discounting Task













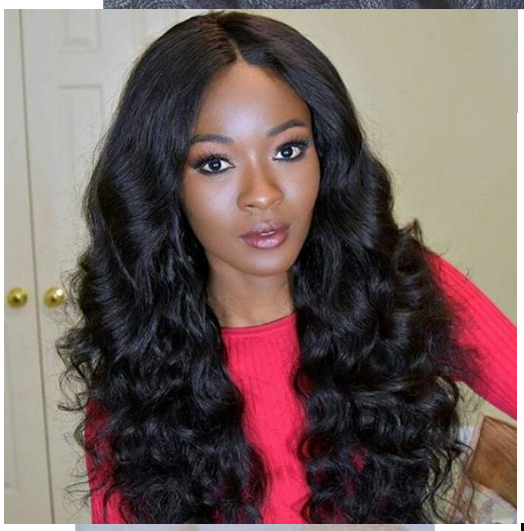






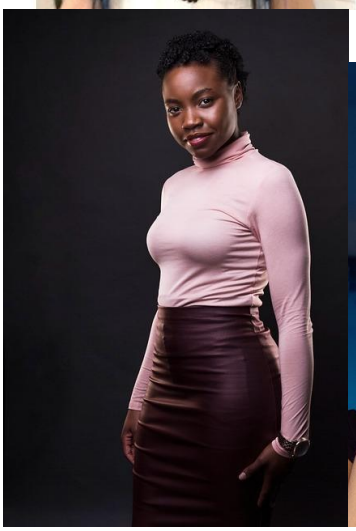


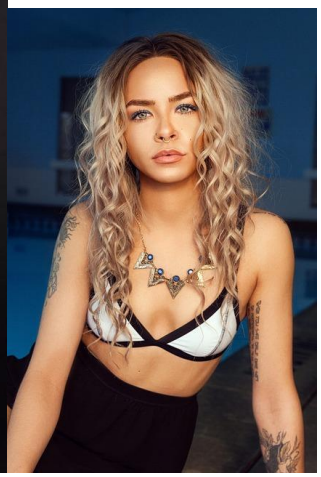




















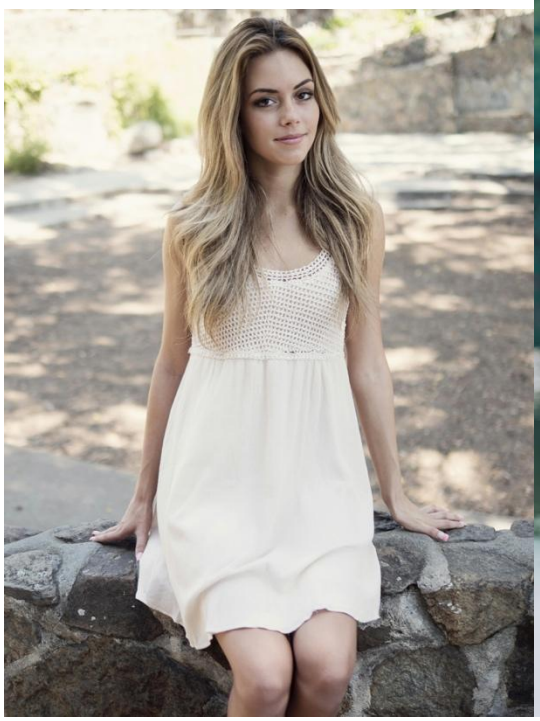




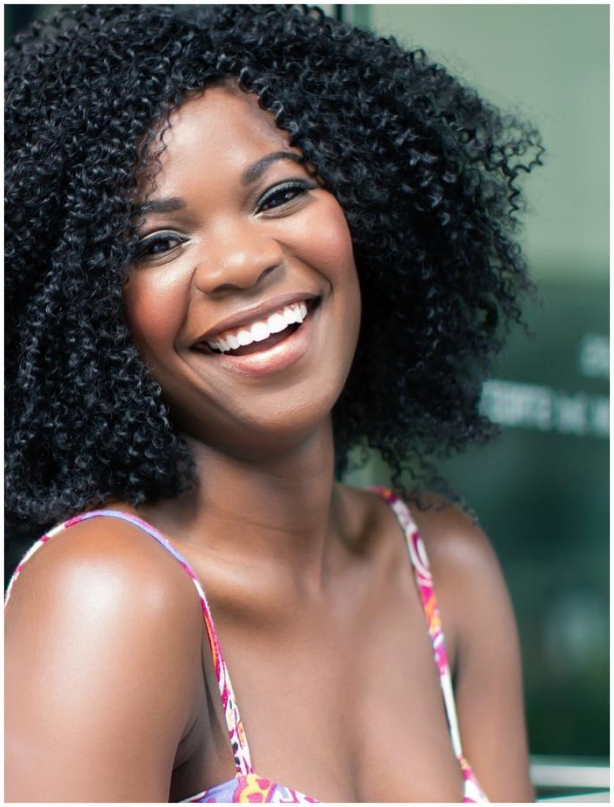








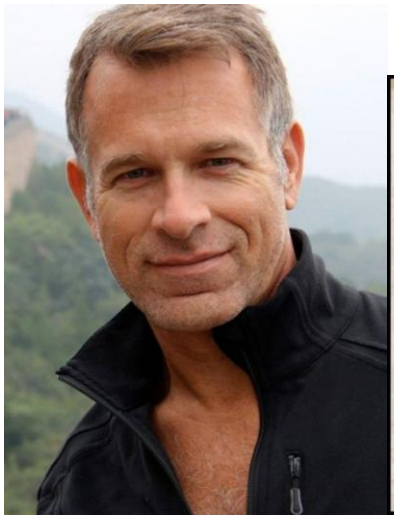






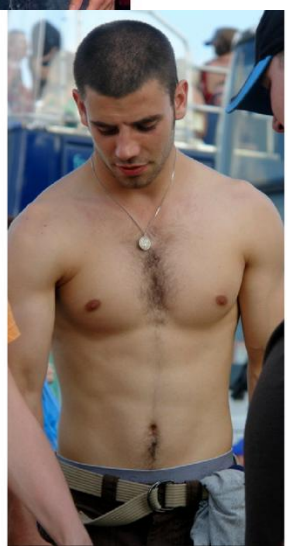


Men

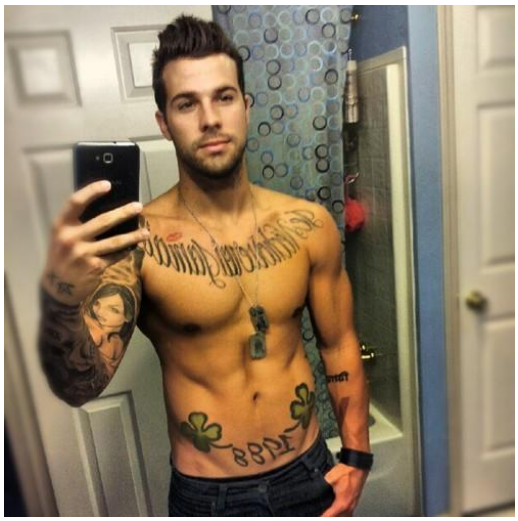






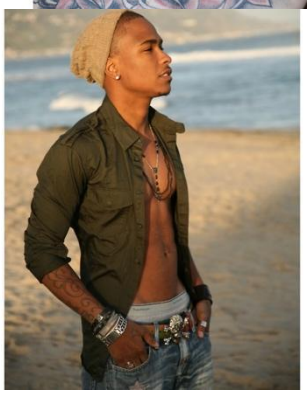




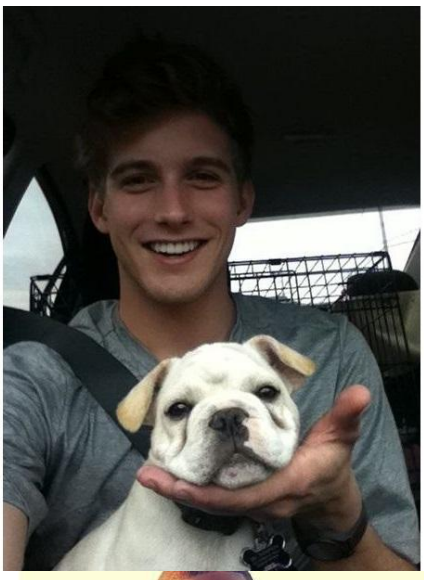


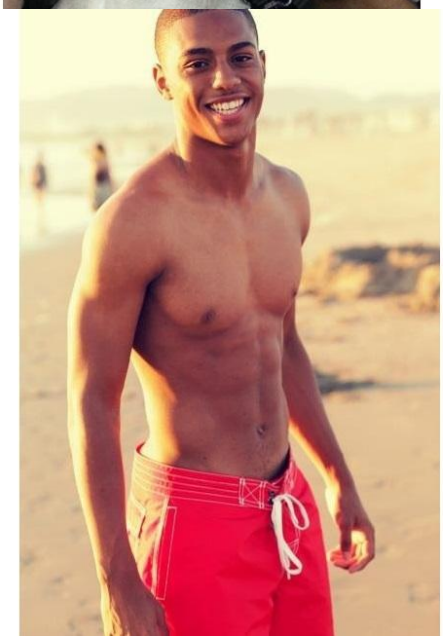








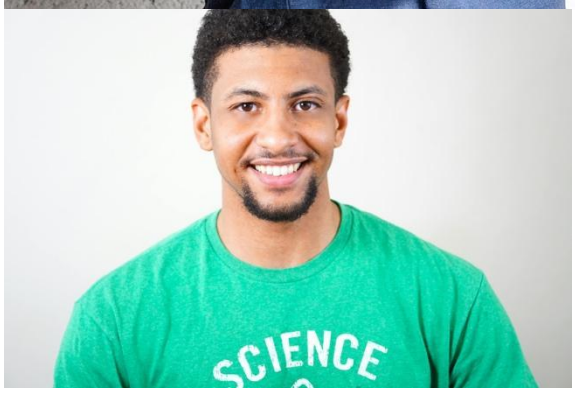










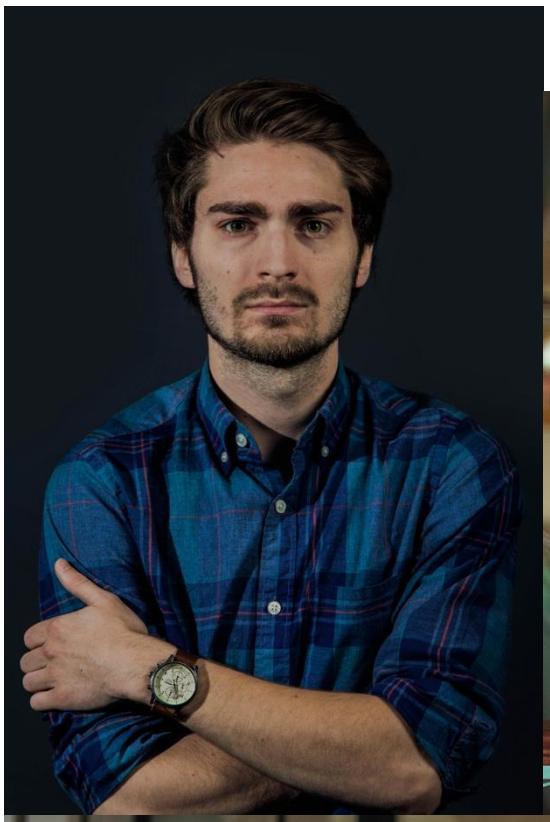

SCIENCE























Appendix J. Distractor Tasks

Sun Safety

1. How often do you use sunscreen when you are outdoors?
   - Always
   - Often
   - Sometimes
   - Rarely
   - Never

2. What SPF (Sun Protection Factor) sunscreen do you typically use?
   - SPF 15 or lower
   - SPF 16-30
   - SPF 31-50
   - SPF 51 or higher
   - I don't use sunscreen

3. How often do you reapply sunscreen when spending extended time outdoors?
   - Every 2 hours or more frequently
   - Every 2-4 hours
   - Once during the day
   - Only when I first go outside
   - I don't reapply sunscreen

4. Do you wear protective clothing (e.g., hats, long sleeves) when you are out in the sun?
   - Always
   - Often
   - Sometimes
   - Rarely
   - Never

5. Have you ever had a sunburn in the past year?
   - Yes
   - No

6. **How often do you seek shade when outdoors for extended periods?**
   - Always
   - Often
   - Sometimes
   - Rarely
   - Never

7. Do you wear sunglasses that provide UV protection when you are outside?
   - Always
   - Often
   - Sometimes
   - Rarely
   - Never

8. What are the main reasons you may not practise safe sun behaviour? (Select all that apply)
   - Forgetfulness
   - Inconvenience

- Dislike of sunscreen texture/smell
- Belief that it is not necessary
- Desire to tan
- Lack of information
- Other (please specify)

Recycling Behaviour

1. How often do you recycle household waste?
   - Always
   - Often
   - Sometimes
   - Rarely
   - Never

2. What types of materials do you regularly recycle? (Select all that apply)
   - Paper
   - Plastic
   - Glass
   - Metal
   - Organic waste
   - Electronics
   - Other (please specify)

4. How convenient is the recycling system in your area?
   - Very convenient
   - Convenient
   - Neutral
   - Inconvenient
   - Very inconvenient

5. How knowledgeable do you feel about what can and cannot be recycled?
   - Very knowledgeable
   - Knowledgeable
   - Neutral
   - Not very knowledgeable
   - Not knowledgeable at all

6. What are the main barriers that prevent you from recycling more? (Select all that apply)
   - Lack of information
   - Inconvenient recycling facilities
   - Time constraints
   - Doubt about the effectiveness of recycling
   - Lack of space for storing recyclables
   - Other (please specify)

7. Do you believe that your efforts in recycling make a difference?
   - Strongly agree
   - Agree
   - Neutral
   - Disagree
   - Strongly disagree

8. How would you rate your community's efforts in promoting and facilitating recycling?
   - Excellent
   - Good
   - Fair
   - Poor
   - Very poor

9. What improvements would you suggest to increase recycling rates in your community?
   - More recycling bins
   - Better education and awareness programs
   - Financial incentives
   - Improved collection services
   - Stricter regulations and enforcement
   - Other (please specify)

Appendix K. Sexual Communication Self Efficacy (Quinn–Nilas et al., 2016)

Answer very difficult, difficult, easy, very easy

1. Ask how many partners they have had?
2. Ask if they have ever shared needles?
3. Ask if they are having sex with other people?
4. Ask if they have ever had a sexually transmitted infection?
5. Ask if a condom could be used for sex with them?
6. Demand that a condom be used?
7. Refuse to have sex if they won't use a condom?
8. Tell them a certain sexual activity hurts you?
9. Tell them if a certain sexual activity makes you uncomfortable?
10. Tell them that a certain sexual activity is not making you feel good?
11. Suggest a new sexual activity (e.g., a new sexual position)?
12. Tell them you do not want to have sex?
13. Tell them you would like to have sex more often?
14. Tell them that a sexual activity feels good?
15. Talk about how it feels to use a condom?
16. Talk about how to put on a condom?
17. Talk about whether a condom is on correctly?
18. Tell them that you want to have sex?
19. Tell them that you like a specific sexual activity?
20. Initiate sex?

Appendix L. STI Risk Perception Questionnaire (Collado et al., 2017)

1. How likely are you to get an STI from oral sex (scale of 1-10)

2. How likely are you to get an STI from vaginal sex (scale of 1-10)

3. How likely are you to get an STI from anal sex (scale of 1-10)

Appendix M. Vignettes.

1. On a night out, you meet a friend of a friend, named Sam. While nothing sexual happens with Sam on that night, you both stay in touch and go on a few dates. While fooling around with Sam after a few dates, you decide to "take it to the next level" and have sex. However, neither of you have any protection, and you know that the nearest shop is closed. How likely are you to engage in sexual activity with Sam without any protection?
   A) Extremely unlikely
   B) Unlikely
   C) Somewhat unlikely
   D) Neither likely or unlikely
   E) Somewhat likely
   F) Likely
   G) Extremely likely

2. During sexual activity with Sam, someone you have just met on a blind date, you become aware that the protection that you are using has broken, however Sam does not seem to notice. How likely are you to continue to engage in sexual activity with Sam without replacing the broken protection.
   a) Extremely unlikely
   b) Unlikely
   c) Somewhat unlikely
   d) Neither likely or unlikely
   e) Somewhat likely
   f) Likely
   g) Extremely likely

3. An attractive person at a dance club comes up to you and dances with you for a few songs. You learn that their name is Sam. After a while, Sam invites you home so that you can have sex. Once there, you offer to use protection, but they refuse, saying that they prefer sexual activity with no protection because it feels better. How likely are you to proceed to engage in sexual activity with Sam without physical protection?

a) Extremely unlikely
b) Unlikely
c) Somewhat unlikely
d) Neither likely or unlikely
e) Somewhat likely
f) Likely
g) Extremely likely

4. A cute classmate called Sam comes over to your apartment to work on a project. Over the course of the night your flirting progresses to kissing which then progresses to feeling each other's bodies and the removal of some clothing. You can tell that you two are going to end up engaging in some form of sexual activity, but Sam hasn't brought up the issue of using protection. How likely are you to bring it up?

a) Extremely unlikely
b) Unlikely
c) Somewhat unlikely
d) Neither likely or unlikely
e) Somewhat likely
f) Likely
g) Extremely likely

5. While drinking with your friends at a bar one evening, you meet an attractive person at the bar called Sam. You continue to drink at the bar with Sam, and as the night progresses your interactions become more and more flirtatious. After a few hours your friends are feeling worse for wear and decide to go home, but you decide to stay at the bar to continue drinking with Sam. You both want to go dancing, so you move to a club. While at the club,

Sam offers you some drugs they have, and you both take some. You spend a couple of hours dancing at the club, before deciding to go home together. You can tell that you two are going to end up engaging in some form of sexual activity once you go back to your apartment. The last time you had a drink was a couple of hours ago, but you are still feeling a little bit drunk. How likely are you to engage in sexual activity with Sam without using any protection?

a) Extremely unlikely
b) Unlikely
c) Somewhat unlikely
d) Neither likely or unlikely
e) Somewhat likely
f) Likely
g) Extremely likely

6. You have been seeing someone called Sam and engaging in sexual activity with them for a number of months. Your relationship is purely casual, but you have come to know each other quite well over the course of the last few months, and are very comfortable around each other. You regularly use protection when engaging in sexual activity with each other. You meet up one evening, and begin to have sex. Sam does not bring up the topic of protection. How likely are you to bring up the use of protection to Sam?

a) Extremely unlikely
b) Unlikely
c) Somewhat unlikely
d) Neither likely or unlikely
e) Somewhat likely
f) Likely
g) Extremely likely

7. 'You are on a first date with an attractive person you met online, called Sam. You flirt over the course of the night, and after dinner you decide to go back to your apartment with Sam to have sex. Sam assures you that they have recently been tested for STIs, and that you don't need to use protection. How likely are you to believe what Sam has told you?'

a) Extremely unlikely
b) Unlikely
c) Somewhat unlikely
d) Neither likely or unlikely
e) Somewhat likely
f) Likely
g) Extremely likely

8. You are on a first date with an attractive person you met online called Sam. You flirt over the course of the night, and after dinner you decide to go back to your apartment with Sam to have sex. When you get back to your apartment, you begin to engage in sexual activity. You have not had a discussion with Sam about your or their sexual history. How likely are you to ask Sam to use protection?

a) Extremely unlikely
b) Unlikely
c) Somewhat unlikely
d) Neither likely or unlikely
e) Somewhat likely
f) Likely
g) Extremely likely

9. You are on a first date with an attractive person you met online called Sam. You flirt over the course of the night, and after dinner you decide to go back to your apartment with Sam to have sex. When you get back to your apartment, you begin to have sex, however you stop and tell Sam you want to use protection. You ask them to wait while you go to the

bathroom to get some protection. Sam expresses that they don't see the need in using protection. How likely are you to leave the room to get protection in the bathroom?

a) Extremely unlikely
b) Unlikely
c) Somewhat unlikely
d) Neither likely or unlikely
e) Somewhat likely
f) Likely
g) Extremely likely

10. How likely are you to use protection if you didn't know the sexual history of a new sex partner?

a) Extremely unlikely
b) Unlikely
c) Somewhat unlikely
d) Neither likely or unlikely
e) Somewhat likely
f) Likely
g) Extremely likely

11. How likely are you to use protection, even if you were afraid that someone might change their mind about having sex while you went to get the protection?

a) Extremely unlikely
b) Unlikely
c) Somewhat unlikely
d) Neither likely or unlikely
e) Somewhat likely
f) Likely
g) Extremely likely

Appendix N. REC Letter of Approval

Dear Shauna,

Thank you for submitting the amendment for your research project DCUREC/2023/201.

I can confirm that the REC Chair has completed their review and issued approval for the amendment. Please accept this email as formal approval.

Wishing you the very best for your research.

Kind regards,
Christina

Rúnaíocht Coiste Eitice um Thaighde | DCU REC Secretariat
Tacaíocht Taighde | Ollscoil Chathair Bhaile Átha Cliath
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Research and Innovation Support | Invent Building | Dublin City University | Glasnevin Campus | Dublin 9

Appendix O. Materials from Chapter 5.

O.1 Brief Sexual Attitudes Scale (Hendricks et al., 2006)

APPENDIX 1. THE BRIEF SEXUAL ATTITUDES SCALE

Listed below are several statements that reflect different attitudes about sex. For each statement fill in the response on the answer sheet that indicates how much you agree or disagree with that statement. Some of the items refer to a specific sexual relationship, while others refer to general attitudes and beliefs about sex. Whenever possible, answer the questions with your current partner in mind. If you are not currently dating anyone, answer the questions with your most recent partner in mind. If you have never had a sexual relationship, answer in terms of what you think your responses would most likely be.

For each statement:

A = Strongly agree with statement
B = Moderately agree with the statement
C = Neutral - neither agree nor disagree
D = Moderately disagree with the statement
E = Strongly disagree with the statement

Permissiveness

1. I do not need to be committed to a person to have sex with him/her.
2. Casual sex is acceptable.
3. I would like to have sex with many partners.
4. One-night stands are sometimes very enjoyable.
5. It is okay to have ongoing sexual relationships with more than one person at a time.
6. Sex as a simple exchange of favors is okay if both people agree to it.
7. The best sex is with no strings attached.
8. Life would have fewer problems if people could have sex more freely.
9. It is possible to enjoy sex with a person and not like that person very much.
10. It is okay for sex to be just good physical release.

Birth Control

1. Birth control is part of responsible sexuality.
2. A woman should share responsibility for birth control.
3. A man should share responsibility for birth control.

Communion

1. Sex is the closest form of communication between two people.
2. A sexual encounter between two people deeply in love is the ultimate human interaction.
3. At its best, sex seems to be the merging of two souls.
4. Sex is a very important part of life.
5. Sex is usually an intensive, almost overwhelming experience.

Instrumentality

1. Sex is best when you let yourself go and focus on your own pleasure.
2. Sex is primarily the taking of pleasure from another person.
3. The main purpose of sex is to enjoy oneself.
4. Sex is primarily physical.
5. Sex is primarily a bodily function, like eating.

Note. The BSAS includes the instructions shown at the top. The items are given in the order shown. The BSAS is usually part of a battery with items numbered consecutively. The scoring may be reversed, so that A = strongly disagree, etc. The scale names and lines separating scales are not shown to participants.

Appendix O.2. Sexual Risk Survey (Turchik & Garske, 2009)

Instructions: Please read the following statements and record the number that is true for you over the past 6 months for each question on the blank. If you do not know for sure how many times a behavior took place, try to estimate the number as close as you can. Thinking about the average number of times the behavior happened per week or per month might make it easier to estimate an accurate number, especially if the behavior happened fairly regularly. If you've had multiple partners, try to think about how long you were with each partner, the number of sexual encounters you had with each, and try to get an accurate estimate of the total number of each behavior. If the question does not apply to you or you have never engaged in the behavior in the question, put a "0" on the blank. Please do not leave items blank. Remember that in the following questions "sex" includes oral, anal, and vaginal sex and that "sexual behavior" includes passionate kissing, making out, fondling, petting, oral-to-anal stimulation, and hand-to-genital stimulation. Refer to the Glossary for any words you are not sure about. Please consider only the last 6 months when answering and please be honest.

In the *past six months*:

- 1.How many partners have you engaged in sexual behavior with but not had sex with?
- 2.How many times have you left a social event with someone you just met?
- 3.How many times have you "hooked up" but not had sex with someone you didn't know or didn't know well?
- 4.How many times have you gone out to bars/parties/social events with the intent of "hooking up" and engaging in sexual behavior but not having sex with someone?
- 5.How many times have you gone out to bars/parties/social events with the intent of "hooking up" and having sex with someone?
- 6.How many times have you had an unexpected and unanticipated sexual experience?
- 7.How many times have you had a sexual encounter you engaged in willingly but later regretted?

For the next set of questions, follow the same direction as before. However, for questions 8–23, if you have never had sex (oral, anal or vaginal), please put a "0" on each blank.

8.How many partners have you had sex with?

9.How many times have you had vaginal intercourse without a latex or polyurethane condom? Note: Include times when you have used a lambskin or membrane condom.

- 10.How many times have you had vaginal intercourse without protection
- 11.How many times have you given or received fellatio (oral sex on a man) without a condom?
- 12.How many times have you given or received cunnilingus (oral sex on a woman) without a dental dam or "adequate protection" (please see definition of dental dam for what is considered adequate protection)?
- 13.How many times have you had anal sex without a condom?
- 14.How many times have you engaged in anal penetration by a hand ("fisting") or other object without a latex glove or condom followed by unprotected anal sex?
- 15.How many times have you given or received analingus (oral stimulation of the anal region, "rimming") without a dental dam or "adequate protection"(please see definition of dental dam for what is considered adequate protection)?
- 16.How many people have you had sex with that you know but are not involved in any sort of relationship with (i.e., "friends with benefits")?
- 17.How many times have you had sex with someone you don't know well or just met?
- 18.How many times have you or your partner used alcohol or drugs before or during sex?
- 19.How many times have you had sex with a new partner before discussing sexual history, IV drug use, disease status and other current sexual partners?
- 20.How many times (that you know of) have you had sex with someone who has had many sexual partners?
- 21.How many partners (that you know of) have you had sex with who had been sexually active before you were with them but had not been tested for STIs/HIV?
- 22.How many partners have you had sex with that you didn't trust?
- 23.How many times (that you know of) have you had sex with someone who was also engaging in sex with others during the same time period?

Appendix O.3. STI Knowledge Questionnaire

STI Knowledge

Definition for Sexual intercourse": Sexual intercourse: vaginal and anal sex with penetration (penis and/or sex toys), or genital-genital/oral-genital contact with another partner for women who have sex with women

"Sexual partners": any partner you have had sexual intercourse with - as per definition above

1. Which of the following are sexually transmitted infections? Please select all that apply.

a) HIV
b) Syphilis
c) Hepatitis a
d) Hepatitis b
e) Hepatitis c
f) Herpes simplex infection
g) Candidiasis
h) Genital warts
i) Trichomoniasis
j) Gonorrhoea
k) Human papillomavirus (HPV)
l) Rotavirus
m) Influenza
n) Pneumonia

o) Chickenpox
p) Rubella
q) Measles
r) Mumps
s) None

2. STIs can be transmitted through (please select all that apply)
a) Shaking hands
b) Kissing on cheeks
c) Pool water
d) Insect bites
e) Toilet bowl seat
f) Kissing on the mouth
g) Medical examination
h) Dental examination
i) Breastfeeding
j) Vaginal sex
k) Anal sex
l) Oral sex
m) Blood transfusion

3. Which means of contraception protect against STIs? (Please select all that apply)
a) Condoms
b) Abstinence (not having sexual activity of any kind with another person)
c) Intrauterine device
d) Contraceptive pill
e) Trans-dermal patch
f) Vaginal ring
g) Spermicidal gel
h) Coitus interruptus (sexual intercourse in which the penis is withdrawn before ejaculation)
i) Natural methods (i.e. abstaining from sexual behaviour during fertile period of the menstrual cycle)

4. STIs can present with the following symptoms (please select all that apply)
a) Vaginal discharge
b) Urethral discharge
c) Abdominal pain
d) Burning during urination
e) Infertility
f) No symptoms

5. Would you know if you had a sexually transmitted infection?
a) Yes
b) No
c) I don't know

6. Can a person get an STI the first time they have sex?
a) Yes
b) No
c) I don't know

7. Do you know what a smear test is
a) Yes
b) No

8. Does a negative smear test assure a person that they have not contracted any sexually transmitted disease

a) Yes
b) No
c) I don't know

9. Which of the following infections can potentially cause cancer?

a) HIV
b) Syphilis
c) Hepatitis a
d) Hepatitis b
e) Hepatitis c
f) Herpes simplex infection
g) Candidiasis
h) Genital warts
i) Trichomoniasis
j) Gonorrhoea
k) Human papillomavirus (HPV)

10. Is there a vaccine that can protect against some types of STIs?

a) Yes
b) No
c) I don't know

11. If yes, what kind of vaccine exists?

a) HPV vaccine
b) Hepatitis B/HBV vaccine
c) Syphilis
d) Hepatitis C/HCV vaccine
e) No vaccines available

Vaccination against HPV will help prevent HPV infection which can cause genital warts and many HPV-associated cancers. The HPV vaccine is available to gay and bisexual men who have sex with men (gbMSM), including gbMSM living with HIV, up to and including 45 years of age. This is freely available from public STI and HIV clinics – for more information ask your healthcare provider.
Vaccination against HBV will help prevent against contracting a long-term infection which can lead to liver disease. The vaccine is available to anyone at risk of contracting HBV and is given to all babies as part of the 6 in 1 vaccination provided at 2, 4 and 6 months of age.
It is important to note that there is no HCV vaccine and no syphilis vaccine.

12. How long after sexual intercourse do you think the ‘morning-after pill’ or ‘emergency contraceptive pill’ can be effectively used?

a) Up to 12 hours
b) Up to 24 hours
c) Up to 72 hours
d) Up to 5 days
e) Over 5 days
f) Don’t know

Emergency contraception is a back-up contraception. You can use emergency contraception to avoid an unplanned pregnancy after you have had sex without using contraception, or if your method of contraception has failed (for example, the condom slipped or you missed a pill).You can use emergency contraception up to 5 days after having unprotected sex.

You can choose from two different types of emergency contraception options: The emergency contraceptive pill (ECP) and the Copper Coil (also known as post-coital IUCD). The Copper Coil (IUCD) can be fitted as emergency contraception by a family planning clinic or trained doctor up to 5 days after unprotected sex.

Emergency contraception is more effective if you take it as soon as possible after you have had unprotected sex.

Since 1 July 2017, medical card holders can get emergency contraception directly from a pharmacy, free of charge, without having to go to their doctor for a prescription. There is a prescription charge of €1.50.

Emergency contraception is free for women and people with a uterus who are aged 17-26 years of age.

13. Do you know what U=U means?
a) Yes
b) No

The HIV 'viral load' is the amount of HIV in a person's blood. HIV treatment works by stopping the virus from reproducing in the body. HIV treatment can reduce the amount of the virus (viral load) to very low (undetectable) levels. A person living with HIV will have their viral load checked at each clinic visit to monitor how well their treatment is working, and to check that the viral load is undetectable. When a person living with HIV is on treatment and the level of virus (viral load) in the body is so low that it cannot be detected (is 'undetectable'), HIV cannot be transmitted to sexual partners. This is also known as 'undetectable' equals 'untransmittable' (U=U).

14. Do you know what PEP and PrEP are?
a) Yes
b) No

15. If yes, what do PEP and PrEP protect against?
a) All sexually transmitted infections
b) Urinary tract infections
c) HIV

Post-exposure prophylaxis, or PEP, is an emergency measure if someone is exposed to HIV. When a person is exposed to HIV it can take several days for the virus to establish itself in the body. The anti-HIV drugs prescribed as PEP acts to prevent HIV from replicating and taking hold in the body.

PEP should be started as soon as possible and within 72 hours (3 days and nights) after a possible exposure to HIV. A full course of PEP is for 28 days (4 weeks). PEP is available in many STI clinics and in sexual assault units. If it is not possible to get PEP from an STI clinic within 72 hours, PEP can be accessed in a number of emergency departments. The list of locations where PEP is available in Ireland is on the sexualwellbeing.ie or man2man.ie websites.

Appendix P. Accommodation Status Results

Table P.1

Accommodation status of participants

	Frequency	***(%)***	***Mean***	***Range***
Accommodation Status				
Living with housemates	79	29.4		
Number of housemates			2.86	1-7
Living with a partner	43	16		
Sharing a room with roommates	2	.7		
Number of roommates			1	1
Live alone (do not share property with others)	13	4.8		
Live with parents	117	43.5		
On-campus accommodation	5	1.9		
Other arrangements	10	3.7		

Appendix Q. Recruitment Posters





CALL FOR PARTICIPANTS!

We are looking for queer participants to answer questions about their

- Knowledge of sexually transmitted infections
- Attitudes towards sexual behaviour
- Experience of sexual education
- Communication skills

IF YOU'RE INTERESTED , PLEASE SCAN THE QR CODE, OR EMAIL THE STUDY AT DECISION.MAKING@DCU.IE

Appendix R. REC Letter of Approval

Ollscoil Chathair Bhaile Átha Cliath
Dublin City University

DCU

Ms Shauna Glennon
School of Psychology

26th April 2023

REC Reference:	**DCUREC/2023/045**
Proposal Title:	**Investigating Sexual Attitudes, Knowledge of Sexually Transmitted Infections, Sexual Self Efficacy and Sexual Risk Taking**
Applicant(s):	**Ms Shauna Glennon, Dr Sinead Smyth, Dr Catherine Fassbender, Dr Nicola O'Connell**

Dear Colleagues,

Thank you for your application to DCU Research Ethics Committee (REC). Further to expedited review, DCU REC is pleased to issue approval for this research proposal.

DCU REC's consideration of all ethics applications is dependent upon the information supplied by the researcher. This information is expected to be truthful and accurate. Researchers are responsible for ensuring that their research is carried out in accordance with the information provided in their ethics application.

Materials used to recruit participants should note that ethical approval for this project has been obtained from the Dublin City University Research Ethics Committee. Should substantial modifications to the research protocol be required at a later stage, a further amendment submission should be made to the REC.

Yours sincerely,

DCU
Research & Innovation



Dr. Melrona Kirrane
Chairperson
DCU Research Ethics Committee

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Note: Please retain this approval letter for future publication purposes (for research students, this includes incorporating the letter within their thesis appendices).

Appendix S. Recoding Sexual Risk Survey Scores

Appendix S.1.

Recoding the raw Sexual Risk Survey scores into ordinal categories (from Chapter 5)

	'0'		'1'		'2'		'3'		'4'	
	Raw	%	Raw	%	Raw	%	Raw	%	Raw	%
1. Number of sexual behaviour partners	0	39.8	1	30.5	2-4	19	5-25	8.4	30-100	2.2
2. Left social event with someone	0	74	1	12.6	2-3	8.9	4-6	2.6	8-20	1.9
3. Sexual behaviour with acquaintance	0	68.3	1-2	16.2	3-5	9	6-10	4.6	12-100	1.9
4. Intent of sexual behaviour	0	75.5	1-4	12.6	5-9	5.7	10-19	4.6	20-200	1.5
5. Intent of engaging in sex	0	76.1	1-2	10.4	3-5	7.5	6-12	3.7	15-30	2.2
6. Unexpected sexual experience	0	48.4	1-2	28.3	3-4	10.5	5-9	7.1	10-50	5.7
7. Regretted sexual encounter	0	62.6	1	16	2	8.9	3	6.7	4-60	5.7
8. Number of sex partners	0	9.7	1	45.4	2-3	18.7	4-9	16.8	10-100	9.4
9. Vaginal sex without a condom	0	36.9	1-6	25.3	7-36	20.9	40-55	10.1	56-700	6.8
10. Vaginal sex with birth control	0	46.9	1-5	21.6	6-20	16.8	22-54	9.9	56-500	4.9
11. Fellatio without a condom	0	22.8	1-9	34.7	10-23	22.4	25-50	13	52-500	7.1
12. Cunnilingus without protection	0	32.7	1-6	26.8	7-22	21.7	25-55	12.1	60-500	6.7
13. Anal sex without a condom	0	80.2	1-2	10.8	3-7	4.1	10-17	2.7	26-100	2.2
14. Unprotected anal penetration	0	89.5	1-2	5.6	3-9	2.4	10-20	1.6	23-100	1
15. Analingus without protection	0	77.4	1-2	10.1	3-8	6.1	10-25	4.9	30-50	1.5
16. Sex with uncommitted partners	0	57.9	1	16.7	2-3	16	4-7	6.4	8-60	3

17. Sex with someone did not know well	0	63.4	1	13.8	2-3	10.5	4-8	7.9	9-35	4.5
18. Sex under influence of substances	0	29.2	1-4	26.8	5-9	18.2	10-26	17.4	28-250	8.4
19. Sex before discussing risk factors	0	60.7	1-2	20.2	3-4	10.5	5-10	6.3	11-100	2.4
20. Partners with many past partners	0	54.5	1-2	24.7	3-5	10.3	6-20	8.4	25-80	2.2
21. Sex with untested partners	0	64.4	1	17.1	2-3	12.8	4-6	2.8	7-20	3
22. Sex with partner did not trust	0	72.5	1	13	2	6.3	3-4	5.6	5-9	2.6
23. Partners with other current partner	0	69.7	1	12.6	2-3	10.8	4-7	4.3	8-65	2.6

Appendix T. Additional Analysis from Chapter 5

Relationship Between Sexual Education and Sexual Risk

One of the key research questions was to investigate the relationship between sexual education, both formal and informal, and sexual risk. As such, a number of correlations were conducted, specifically between age of first receipt of RSE, whether participants have ever had a conversation with their parents about sex/relationships, age of first conversation with parents about sex/relationships, and rating of formal sexual education. Correlations between these variables were mostly non-significant; Pearson's r was calculated for each correlation between scale variables. There was a positive and weak, but significant correlation between age of first conversation with parents/guardians about sex/relationship and SRS ($r = .213$, $p < .01$). As such, a linear regression was conducted in order to identify the predictive power of age of first conversation with parents/guardians about sex/relationships. The regression analysis was significant {$F(1, 176) = 8.325$, $p < .01$}, indicating that the age at which participants first had a conversation with their parents or guardians about sex predicted their self-reported sexual risk in the past 6 months.

For the categorical variables, which were if participants had ever had a conversation with their parents/guardians about sex or relationships and their rating of their formal sexual education, a linear regression was conducted for each variable. Categorical variables were dummy coded and entered as predictors into the regression. Neither regression analysis returned a significant result.

Impact of Social Media on Sexual Knowledge

27.9% of participants indicated that social media is the most informative in helping them avoid STI transmission as an adult, and 36.4% indicated that an internet health website was the most informative. A full breakdown of responses can be seen in Table T.1.

See also Figure T.1. for participants' ranking of sources that impacted their STI knowledge as adolescents from 1-8

Appendix T.1

Participant responses to the question 'Where would you say you get MOST of information or advice on sex and relationship issues now?'

Source	**Percentage**
Parents/guardian	.7
Friends	23
Teacher	.4
Internet health website	36.4
Social media	27.9
Books/magazines/TV/films	2.2
Doctor/Nurse	3

Appendix T.2

Participants' ranking of sources that impacted their STI knowledge as adolescents from 1-8

