Predictors of Sexual Risk-Taking Among Regular Ecstasy Users: Personality, Outcome Expectancies and Ecstasy Use.

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Declaration

I, Phoebe Proudfoot, hereby declare that, except where acknowledged, this work is my own and has not been submitted for a higher degree at any other university or institution.

Phoebe Proudfoot

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Abstract

The use of MDMA (3,4-methylenedioxymethamphetamine) or 'ecstasy' is associated with elevated levels of risky sexual behaviour. This dissertation reports on three studies that investigated how level of ecstasy use, ecstasy outcome expectancies, and personality influence sexual risk-taking behaviour among regular users of this drug. All three studies employed a survey methodology. In Study One, a sample of regular ecstasy users (N = 220) were interviewed regarding their drug use, their beliefs or 'expectancies' about the effects of ecstasy, and their sexual risk-taking behaviour. In a set of findings supporting the outcome expectancy paradigm, Study One found that individuals who held positive sex-related expectancies for ecstasy were more likely to be involved in disinhibited sexual activity related to ecstasy use. Study Two (N = 126) was designed to explore the role of personality in predicting sexual risk-taking behaviour, and to determine whether ecstasy outcome expectancies would predict this behaviour after controlling for the influence of personality. For this purpose, personality was examined at a general level (employing a five factor model of personality), and at the level of sexuality (conceptualised by the sexual self-schema construct). Using logistic regression analyses, the key finding of Study Two was that higher levels of neuroticism-anxiety (although not sexual specific anxiety) predicted involvement in disinhibited sexual behaviour under the influence of ecstasy. Not surprisingly, Study Two also found that individuals who use ecstasy on a more frequent basis (fortnightly or greater than frequency) were more likely to engage in disinhibited sexual behaviours under the influence of ecstasy. With respect to the outcome expectancy findings, consistent with the findings of Study One, positive sex-related ecstasy outcome expectancies predicted in Study Two all three forms of sexual risk-taking assessed – having sex under the influence of ecstasy, having sex without a condom under the influence of ecstasy, and having unintended sex while under the influence of ecstasy. In both studies, these effects persisted after statistically controlling for patterns of ecstasy use, and in Study Two, also after controlling for five broad dimensions of personality. Based on the personality findings of Study Two, a third study was designed to investigate more closely the role of personality in predicting sexual risk-taking behaviour among ecstasy users. The aim of Study Three (N = 137) was to examine differences in personality and sexual risk-taking between ecstasy using and non-using young adults. In addition to questions regarding their drug use and sexual behaviour, both ecstasy users and non-ecstasy users completed a five factor personality inventory and questionnaires assessing social anxiety. The central finding in Study Two – that increasing levels of neuroticism-anxiety predicted

disinhibited sex for ecstasy users – was not replicated in Study Three. In an unexpected set of findings, this dissertation found no association between impulsive and sensation-seeking personality traits and any form of sexual risk-taking behaviour assessed for 'high-risk' (ecstasy users) or 'typical risk' (non-ecstasy users) young adults. Overall, the results presented in this thesis affirm the complex relationship between personality traits and sexual risk-taking behaviour. While the relationship between personality and sexual risk-taking behaviour among regular ecstasy users remains contradictory, the studies reported suggest that heavier ecstasy use is associated with sexual risk-taking among ecstasy users. However, in addition to this finding, the results reported in Study One and Study Two are consistent with an outcome expectancy framework suggesting that changes in the sexual behaviour of humans that result from ecstasy use can partially be explained in terms of what an individual expects to occur if they consume ecstasy. That is, ecstasy users who believe that ecstasy will result in sexual disinhibition are at higher risk of engaging in sexual risk-taking behaviour. These findings have practical implications for informing public health campaigns aimed at encouraging safe sex among ecstasy users.

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CHAPTER ONE

General Introduction and Overview

1.1 The Risks Associated with Sexual Activity

In spite of the damaging consequences associated with certain behaviours, some humans behave in ways that place their own welfare and that of others at significant risk. Attempts to elucidate what drives people to firstly engage in and then continue to engage in risk-taking behaviours have long been a focus of psychological research. Sexual activity, which often plays an important and meaningful role in human relationships, simultaneously holds the potential to jeopardise one's physical and psychological health if reasonable safety measures are not followed. Not surprisingly then, sexual risk-taking in particular has demanded a significant proportion of the focus in the risk-taking literature.

Although considerable medical and technological advancements continue to be made, the cost of sexual and reproductive ill-health worldwide remains enormous (Glasier, Gulmezoglu, Schmid, Moreno, & Van Look, 2006). The consequences of risky or unsafe sexual behaviour are perhaps most evident in the world's poorest communities, with recent statistics identifying unsafe sexual activity as the second most important risk factor leading to disability or death in marginalised and developing countries (Ezzati et al., 2002; Glasier et al., 2006). In industrialised countries unsafe sexual behaviour also has potentially serious physical, psychological and economic consequences, with unsafe sex identified as the ninth most important risk factor leading to disability or death in the developed world (Glasier et al., 2006).

The risk associated with unsafe sexual activity that poses perhaps the greatest threat and accordingly has attracted the most research to date, is the acquisition of the human immunodeficiency virus (HIV). At this point in time a cure for HIV remains elusive, and behaviour change therefore remains a critical factor in preventing the further spread of the virus. In response to the acquired immunodeficiency syndrome (AIDS) epidemic of the late 1970s, the volume of behavioural research on risky sexual behaviour increased dramatically. The primary focus of this literature was to examine specific sexual behaviours, such as sex without a condom, that are known to increase one's chance of contracting HIV (Hoyle, Fejfar, & Miller, 2000). However, the risks associated with engaging in sexual activity that

may lead to HIV infection can also result in the contraction of other sexually transmitted infections (STIs) and also unplanned pregnancy.

STIs have been identified by the World Health Organisation (WHO) as a worldwide cause of acute illness and infertility with serious medical consequences for both males and females (WHO, 2001). A global pattern indicates that the highest rates of STIs are observed in males and females who reside in urban areas and are aged between 15 and 35, corresponding to the most sexually active years of the human lifespan. Throughout the world STIs (other than HIV) are the second most significant cause of loss of health in females, especially young females, and are a significant cause of morbidity in males (Glasier et al., 2006). Even in developed countries where effective treatments of STIs such as chlamydia, gonorrhoea and syphilis are readily available, these conditions pose significant health complications. In addition to the malaise resulting from the acute infection, both symptomatic and asymptomatic infections when left untreated, can contribute to the development of long-term health problems such as pelvic inflammatory disease, infertility and cervical cancer (WHO, 2001). Furthermore the acquisition of certain STIs can also enhance the transmission of HIV (M. Cohen, 1998). For example, the WHO has identified that the presence of an untreated STI (ulcerative or nonulcerative) can increase both the risk of transmission and acquisition of HIV by a factor of up to 10 (WHO, 2001).

Data collected by the National Centre in HIV Epidemiology and Clinical Research (NCHECR) has demonstrated that over the past ten years, Australia has continued to experience increasing rates in the annual rates of diagnosis for a number of STIs including HIV (NCHECR, 2005, 2006, 2008). Between 1999 and 2007 the number of new HIV diagnoses in Australia increased by almost 50%, from 718 cases in 1999 to approximately 1051 in 2007 (NCHECR, 2008). Historically the vast majority of new HIV diagnoses have been witnessed among males with a reported history of homosexual contact. However, the number of new HIV diagnoses for which exposure to HIV was attributed to heterosexual contact has also increased from 804 in 1998 to 2002, to 994 in 2003 to 2007 (NCHECR, 2008). Consistent with trends over recent years chlamydia remained the most frequently reported notifiable condition in Australia in 2007, with 51 867 new diagnoses. This statistic represents a fourfold increase in the reported number of chlamydia diagnoses over the past ten years, doubling from 74.8 (per 100 000) in 1998 to 146.3 in 2002, and then doubling again in 2007 to 293.0 per 100 000. When examining rates of infection according to age, the increases in the rate of diagnosis of chlamydia were highest in the 20 to 29 and 15 to 19 year age groups. When combined these age groups accounted for over three quarters of the

annual number of diagnoses. The rates of diagnosis of gonorrhoea have fluctuated somewhat over recent years, increasing from 33.7 (per 100 000) in 2004 to 41.3 in 2006, and then declining to still concerning levels at 36.1 in 2007. Although the rates of diagnosis of infectious syphilis remained low in comparison to other STIs, recent statistics indicate that rates in 2007 have doubled from 3.1 per 100 000 in 2004 to 6.6 per 100 000 in 2007. This increase was most pronounced among young adults, with a 60% increase observed in the 20 to 29 year age group specifically. Collectively, both the high rates currently observed for a number of STIs and the fact these rates continue to increase provide considerable cause for concern. In addition, some researchers have argued that reported rates of STIs may in fact underestimate the true incidence of these conditions, given that many infections go unnoticed due to an asymptomatic presentation, and the stigma that is still associated with sexual issues (AIHW, 2003).

Unplanned pregnancy is yet another consequence that sexually active individuals may have to contend with. Females who are faced with an unplanned pregnancy are required to make a decision about the outcome of that pregnancy, and although surgical abortion is now a readily available option in Australia, the issue is still contentious. In most Australian states induced abortion remains in the criminal codes, and consequently the available data are limited. There is recent data available however that emphasises the importance of the issue of unintended pregnancy among Australia's young population. Through conservative estimates, the Australian Institute of Health and Welfare (AIHW) estimated that there are approximately the same number of induced terminations as live births among young females in Australia (AIHW, 2003). The AIHW (2003) has also identified medical or induced abortion as the second most common reason for hospitalisation among young females aged 18 to 24, and the third most common for young females in the 15 to 17 year age bracket. Furthermore, in 2000 to 2001 diagnoses related to childbirth and pregnancy were the most common reasons for hospitalisation among the entire 12 to 24 age group (AIHW, 2003). When these statistics are considered in light of the rising rates of STIs observed in Australia above, the collective data emphasise the contribution that problems resulting from sexual activity make to overall morbidity in the adolescent and young adult demographic in Australia.

In addition to the direct physical risks emphasised above, psychological risks involved with coercion, unwanted or unintended sexual activities (and the experience of embarrassment and shame that may arise as a consequence) can also compromise an individual's sexual health. Based on the high likelihood of negative outcomes resulting from

unsafe sexual behaviour, there is obvious benefit to be gained from research that attempts to enhance an understanding of what contributes to and maintains engagement in risky sexual activities (Hoyle et al., 2000; Miller et al., 2004). From a public health standpoint, acquiring reliable knowledge of both the prevalence of sexual and risk-taking behaviour and also the factors contributing to such behaviours is essential in order to develop an effective public health response to STIs, unplanned pregnancy and the psychological consequences that these physical costs carry with them (Grulich, de Visser, Smith, Rissel, & Richters, 2003b; Poulin & Graham, 2001).

1.2 The Association Between Substance Use and Risky Sexual Behaviour

The perception that some psychoactive drugs serve as an aphrodisiac is firmly embedded in Western culture and the use of mind-altering substances, such as alcohol, in combination with sexual encounters is a long-standing practice (Markos, 2005; Peugh & Belenko, 2001). The use of alcohol or other drugs with sex is one of the major factors that has been proposed as a contributor to understanding risky sexual behaviour in research conducted so far. On the basis of the perceived positive relationship between alcohol use and sexual behaviour, the observed association between alcohol use and sexual risk-taking behaviour in particular can also be understood. Due to its legal status and widespread use, the initial focus of research investigating the substance use and sexual risk-taking link centered on examining the specific association between alcohol use and risky sex. In more recent times, this research has expanded to also consider the relationship between sexual behaviour and illicit substances such as 'ecstasy' (Klitzman, Greenberg, Pollack, & Dolezal, 2002; Klitzman, Pope, & Hudson, 2000; Novoa, Ompad, Wu, Vlahov, & Galea, 2005), methamphetamine (Baskin-Sommers & Sommers, 2006; Page-Shafer et al., 1997), cannabis (Brodbeck, Matter, & Moggi, 2006; Graves & Leigh, 1995; Poulin & Graham, 2001), and other 'party drugs' (Choi et al., 2005; Colfax et al., 2001; Colfax et al., 2004; Mattison, Ross, Wolfson, & Franklin, 2001; Volk et al., 2006).

A review of the research as it stands today suggests that the use of alcohol and other psychoactive substances serves as a predictor of sexual risk-taking behaviour. Compatible with widespread opinion, the literature supports a general association between alcohol use and risky sexual behaviour (for reviews of this topic see George & Stoner, 2000; Leigh & Stall, 1993; Weinhardt & Carey, 2000). More specifically, the research findings indicate that those individuals more likely to engage in sexual risk-taking are also

more likely to drink alcohol (both in larger quantities and on a more frequent basis), to use illicit drugs and to use these substances in combination with sex.

In research that attempts to understand the relationship between substance use and sexual risk-taking behaviour, it is critical to acknowledge the complex nature of both these behaviours when considered independently of the other. Previous research has shown that both drug use and sexual behaviour are influenced by a number of interacting mechanisms – biological, psychological and social – and it follows therefore that the relationship between these two behaviours would also be complex, involving a range of processes (Cooper, 2006; Leigh & Stall, 1993; Peugh & Belenko, 2001). To date, the mechanisms through which the association between substance use and risky sexual behaviour can be understood have been investigated primarily in relation to alcohol use. The major frameworks through which the association between drug use and risky sexual behaviour have been explained relate to the direct, biological actions of the drug itself – for example cognitive impairment caused by substance use or sexual disinhibition – or alternatively, emphasise aspects of the individuals who engage in drug use and risky sexual behaviour – such as one's beliefs about the effects of a certain drug, or enduring aspects of their personality.

1.3 Ecstasy Use and Sexual Behaviour

MDMA (3,4-methylenedioxymethamphetamine) or 'ecstasy' is a drug that is widely used in many parts of the world and has achieved specific popularity among young adults. One of the consequences of ecstasy use that is believed to attract individuals to initiate use of the drug is the enhancement of social interactions. Ecstasy has gained a reputation as the 'love drug' because of the feelings of increased 'connectedness' and empathy towards others which users consistently report experiencing whilst under its influence (Beck & Rosenbaum, 1994; Holland, 2001). When used in a social setting, other benefits associated with ecstasy use such as heightened sensations, prolonged energy and increased confidence, are believed to encourage physical contact and further promote the social enhancement aspects of the drug, and in turn appear to relate to ecstasy use and sexual behaviour. When considering the social 'bonding' aspects in conjunction with the positive physical effects that accompany its use, it is not surprising that ecstasy has enjoyed the reputation as an enhancer of sexual performance. In recent years, sexual risk-taking has been identified as a serious public health issue associated with ecstasy use (Black et al., 2008; Boyd, McCabe, & d'Arcy, 2003; Choi et al., 2005; Dunn et al., 2007; Klitzman et al., 2002; Klitzman et al.,

2000; Mattison et al., 2001; Novoa et al., 2005; Stafford et al., 2005; Stafford et al., 2006; Strote, Lee, & Wechsler, 2002; Theall, Elifson, & Sterk, 2006; Topp, Hando, & Dillon, 1999; Waldo, McFarland, Katz, MacKellar, & Valleroy, 2000). With the exception of a small number of studies employing 'high risk' populations such as gay and bisexual males (Choi et al., 2005; Klitzman et al., 2002; Klitzman et al., 2000; Mattison et al., 2001; Waldo et al., 2000) and injecting drug users (Novoa et al., 2005) little research however has been conducted to directly examine the relationship between ecstasy use and 'risky' sex. In addition there is no known research that has attempted to explore the impact of factors other than the disinhibiting properties of the drug itself when seeking to understand the relationship between ecstasy use and subsequent risky sexual behaviour.

1.4 The Purpose of this Thesis

The research reported in this thesis investigates the predictors of sexual risk-taking behaviour among young adults in Australia who identify as regular ecstasy users. Chapter Two first reviews the literature on what is currently known about ecstasy use, focusing on the short and long-term effects of use and current patterns and rates of use. Additionally, Chapter Two also examines the research that has investigated the impact of ecstasy use on sexual functioning and presents the literature in which the association between ecstasy use and sexual risk-taking is established. Chapter Three then reviews the literature on sexual risk-taking behaviour; this chapter first considers how sexual risk-taking has been defined in the research so far and reports on current rates of 'key' sexual risk-taking behaviours. A comprehensive review of the literature that has been used to establish the relationship between general substance use and risky sexual behaviour is then discussed. Finally, the results of studies that have attempted to explain the relationship between substance use and risky sex in terms of a cognitive variable – outcome expectancies – are presented. Following this, Chapter Four reports on the findings of a study that investigates the specific relationship between ecstasy outcome expectancies and sexual risk-taking behaviour. The primary aim of this study was to examine whether, as has been observed for alcohol, ecstasy outcome expectancies predict risky or disinhibited sexual behaviour under the influence of ecstasy. Building on these findings, Chapter Five then examines and presents the results of a second study that investigates the relationship between personality, sexual self-concept, ecstasy outcome expectancies and sexual risk-taking. Based on the findings presented in the previous two chapters, the third study reported in Chapter Six examines differences in sexual risk-taking between a group of non-ecstasy using young adults and ecstasy users, and the personality variables that predict risk-taking within each

group. This study also explores the relationship between social anxiety and sexual risk-taking in a sample of young adults. Finally, Chapter Seven provides an overall summary of the results obtained in this dissertation. This discussion includes a review of both the implications and the limitations of these findings, and also considers avenues for future research.

CHAPTER TWO

Ecstasy

2.1 Chemical Composition of Ecstasy

MDMA, the active component of the street drug 'ecstasy', is a synthetic methamphetamine derivative that belongs to the phenethylamine family. Structurally, ecstasy is related to both methamphetamine and mescaline (a hallucinogen) although its unique psychoactive effects distinguish it from classic hallucinogen and stimulant profiles (Julien, 1998; Kalant, 2001; Morgan, 2000; Morton, 2005). An increased sense of empathy or connection to others, along with heightened emotional experience, are the defining psychoactive effects associated with ecstasy use. As such it has been proposed that ecstasy belongs in its own pharmacological class, termed the 'entactogens' or 'empathogens' (Holland, 2001; Morgan, 2000). The primary mechanisms of action in the human brain that underpin the unique psychological effects of ecstasy include the blockade of serotonin reuptake, the induction of serotonin release and to a lesser extent, the induction of dopamine release (Hall & Henry, 2006; Kalant, 2001; Malberg & Bonson, 2001). Like amphetamine, ecstasy leads to an increase in the release of noradrenaline (Hall & Henry, 2006; Kalant, 2001). Ecstasy administration results in a biphasic pattern of intoxication characterised by increased arousal and a sense of euphoria lasting for approximately four to six hours, this is then followed by a residual phase which can last for a number of days and is characterised by depression, fatigue and irritability (Gold, Tabrah, & Frost-Pineda, 2001; Morgan, 2000).

Ecstasy was synthesised by the German pharmaceutical company Merck in 1912 and was included as a precursor agent in the patent for the styptic medication, hydrastinine (Holland, 2001). Contrary to reports that ecstasy was originally marketed as an appetite suppressant, there was no use mentioned for ecstasy in the patent application. Ecstasy only really became popular in the late 1970s, when its use emerged primarily in a psychotherapeutic context in the United States (US). Growing numbers of clinicians had begun to administer ecstasy to clients in the belief that it lowered clients' defences and heightened their introspective abilities, and thus facilitated the therapeutic process. In 1985 however, ecstasy was made illegal under emergency action by the US Drug Enforcement Administration's placement of the drug in Schedule I of its regulations. Ecstasy was placed in Schedule I internationally in 1986, but despite its illegal status the use of ecstasy

continued to proliferate. Ecstasy gained popularity during the 1980s particularly in the 'rave' and dance party culture, and since then, the recreational use of ecstasy has expanded to other contexts.

2.2 Acute and Subacute Subjective Effects of Ecstasy

The subjective effects of ecstasy typically emerge within 20 to 40 minutes after administration (Gold et al., 2001; Green, Mechan, Elliott, O'Shea, & Colado, 2003; Hall & Henry, 2006; Morgan, 2000; Teter & Guthrie, 2001). The popularity of ecstasy has been primarily attributed to feelings of euphoria and connection and closeness to others that are experienced during the period of acute intoxication (Baylen & Rosenberg, 2006; R. Cohen, 1995; Davison & Parrott, 1997; Solowij, Hall, & Lee, 1992; ter Bogt & Engels, 2005; Vollenweider, Gamma, Liechti, & Huber, 1998; Bethany White et al., 2006). Reviews of the literature also indicate that ecstasy users consistently report feelings of increased confidence, peacefulness and an 'openness' to new ideas as benefits that promote or reinforce continued use of the drug (Baylen & Rosenberg, 2006; Morgan, 2000). In addition to the noted positive psychological effects associated with ecstasy use, a number of physical benefits such as increased energy, sense of endurance, heightened sensations and enhanced sexual desire have also been reported (Baylen & Rosenberg, 2006; R. Cohen, 1995; Davison & Parrott, 1997; Solowij et al., 1992; Bethany White et al., 2006; Zemishlany, Aizenberg, & Wiezman, 2001).

Although the appeal of ecstasy lies in the positive effects experienced during acute intoxication, ecstasy is also known to elicit a number of adverse acute and delayed effects that range in severity from relatively benign and uncomfortable to fatal. Despite the widespread use of ecstasy, it is important to note that only a relatively small number of fatalities have been attributed to the drug. The literature on MDMA related fatalities suggests that the physiological changes resulting in death are complex, and perhaps one of the greatest dangers identified with its use is the nonlinear relationship between dose and the severity of the acute toxic reaction (Gold et al., 2001; Morgan, 2000; Teter & Guthrie, 2001). Hyperthermia has been identified as the most dangerous symptom of MDMA intoxication, with most MDMA related deaths resulting from a persistent hyperthermia that leads to other fatal complications (Hall & Henry, 2006; Libiseller, Pavlic, Grubwieser, & Rabl, 2005; Morton, 2005; Patel, Belson, Longwater, Olson, & Miller, 2005; Schifano, 2004; Schifano et al., 2003; Teter & Guthrie, 2001).

The negative physiological effects commonly reported during the acute phase of ecstasy use include bruxism, pupillary dilation, nausea, profuse sweating, tachycardia, confusion and increased thirst (R. Cohen, 1995; Davison & Parrott, 1997; Gold et al., 2001; Hall & Henry, 2006; Liechti, Gamma, & Vollenweider, 2001; Solowij et al., 1992; Topp, Hando, Dillon, Roche, & Solowij, 1999). After the acute effects of ecstasy have ameliorated the onset of a number of other adverse effects such as lethargy, mood fluctuations, irritability, insomnia and paranoia can occur, and typically last for 24 to 48 hours (Curran & Travill, 1997; Morton, 2005; Parrott et al., 2002; Parrott & Lasky, 1998; Topp, Hando, Dillon et al., 1999). In contrast to the predominantly positive feelings experienced whilst under the influence, it is also widely documented that users will normally experience dysphoria while 'coming down' from ecstasy (R. Cohen, 1995; Curran & Travill, 1997; Davison & Parrott, 1997; Parrott et al., 2002; Parrott & Lasky, 1998; Solowij et al., 1992; Verheyden, Henry, & Curran, 2003). This period of low mood typically persists for several days following ecstasy use, and is thought to be the result of a temporary depletion of serotonin stores that follows the acute elevation of serotonin during intoxication (Curran & Travill, 1997; Parrott & Lasky, 1998).

2.3 Neurotoxic Effects of Ecstasy and Long Term Consequences of Use

Studies examining the physiological consequences of ecstasy use on the brains of laboratory animals have firmly established that ecstasy is a serotonergic neurotoxin in a range of animal species, including non-human primates (Green et al., 2003; Lyles & Cadet, 2003; Morgan, 2000). These findings, combined with the stability of evidence across clinical and neurobiological human studies in which the impact of ecstasy on the serotonin system is studied indirectly (McCann, Szabo, Scheffel, Dannais, & Ricuarte, 1998), are the basis for the argument that ecstasy is also neurotoxic in humans (Boot, McGregor, & Hall, 2000; Green et al., 2003; Lyles & Cadet, 2003; Morgan, 2000). Although the methodological problems in this area of research are well documented (Curran, 2000), there is now substantial evidence suggesting that recreational ecstasy use may cause enduring changes to both the availability of serotonin and also the functioning of serotonergic axons in the human brain. In their review of the literature, Boot et al. (2000) identified the use of two or more doses of ecstasy at a time; fortnightly or greater than fortnightly frequency of use; intravenous administration of ecstasy; and continued use of the substance for 24 hours or more, as the patterns of ecstasy use that increase risk of neurotoxic damage.

While it is likely that ecstasy use causes long lasting changes to serotonergic nerve terminals in humans, the implications of these changes in terms of functional consequences are still being determined. To date, the primary focus of research in this area has aimed to elucidate the impact of ecstasy use on a number of aspects of cognitive functioning, in particular, memory. Although the performance of ecstasy users on relatively simple cognitive tasks does not appear to differ from that of non-users, reviews of the evidence at this stage strongly suggests that the continued use of ecstasy is associated with mild, although persistent, memory impairment in humans (Morgan, 2000; Parrott, 2000; Ward, Hall, & Haslam, 2006).

As well as the long-term consequences for cognitive functioning, there is evidence that ecstasy use may also result in a long-term vulnerability to psychopathology. Evidence of this initially emerged in a series of published case studies wherein the use of ecstasy was associated with a number of psychiatric symptoms ranging from psychosis and panic attacks to obsessive compulsive tendencies (McGuire, 2000). In another study using a large (N = 500) representative sample of ecstasy users, Cohen (1995) linked residual psychiatric symptoms such as depression, depersonalisation and flashbacks to ecstasy use. Additionally, in an Australian study examining the effects of ecstasy use in 329 ecstasy users, Topp et al. (1999) documented that almost half their sample reported experiencing psychological side effects in the previous six months, with 40% or more of participants nominating 'depression', 'anxiety,' 'paranoia' and 'confusion'. In independent studies using the same standardised measure of psychological functioning (Symptom Distress Checklist; SCL-90), scores on several of the subscales were significantly higher for previous ecstasy users compared to polydrug and non-drug using controls (Schifano, 2000) and also for current 'heavy' ecstasy users compared to control participants (Parrott, Sisk, & Turner, 2000). Evidence of the association between ecstasy use and the onset of psychiatric problems also comes in the form of a large scale study by Schifano et al. (1998) in which an objective psychiatric evaluation of 150 patients in a drug treatment service, all of whom had used ecstasy at least once in their lifetime, was completed. Approximately half the patients assessed were diagnosed as having one or more psychological disturbances, most commonly depression and psychotic disorders. Using logistic regression analysis, Schifano et al. (1998) identified that polydrug users who had used more ecstasy in their lifetime (a mean of 43 tablets) were at significantly higher risk of developing a psychological disorder than polydrug users who had taken smaller amounts (a mean of 3 tablets).

However, the findings of Schifano and colleagues (1998) and those in the studies described above are subject to a number of methodological criticisms such as the issue of causality (e.g. pre-existing psychopathology might lead to ecstasy use) and the inability to dismiss the impact of other drug use on the development of psychopathological symptoms (McGuire, 2000; Morgan, 2000; Soar, Turner, & Parrott, 2001). Furthermore, the use of ecstasy is most common among young adults, which is the population in which psychological problems are most likely to develop in non-drug using groups (McGuire, 2000). In spite of the problems inherent in interpreting this area of research, the results of these studies, when considered in addition to evidence attesting to the neurotoxic consequences of ecstasy use, suggest that heavier ecstasy use maybe associated with increased risk of mental health concerns. In particular, the evidence suggests that those individuals who use ecstasy in association with other drugs, who use more ecstasy per episode of use or cumulatively over time, and who use over longer periods of time are at increased risk of being diagnosed with psychiatric problems (Gowing, Henry-Edwards, Irvine, & Ali, 2002; Morgan, 2000; Schifano, 2000; Schifano, Di Furia, Forza, Minicuci, & Bricolo, 1998; Soar et al., 2001).

2.4 Prevalence and Trends in Ecstasy Use

Rates of ecstasy use in the general population have continued to increase in many parts of the world during the past decade. In 2004, it was estimated that almost 10 million people worldwide had used ecstasy (United Nations Office on Drugs and Crime, 2006). Data from the 2006 United Nations World Drugs Report suggests that specifically in recent times, rates of ecstasy use have shown divergent geographical trends. For example, while notable decreases in rates of use have been observed in Northern America (Substance Abuse and Mental Health Services Administration, 2006), many Western European countries have experienced the stabilisation of (high) rates of use. A simultaneous expansion of ecstasy use in several south-east European countries and parts of south-east/east Asia and Oceania has also been observed (United Nations Office on Drugs and Crime, 2006).

Given that rates for illicit drug use tend to be highest among the young adult population in particular, it is not surprising that rates of ecstasy use over time have also been shown to be consistently higher among this group. European population-based surveys have established a steady increase in the rates of recent (past year) ecstasy use among young adults from the mid 1990s to the present day (European Monitoring Centre

for Drugs and Drug Addiction, 2005). The countries that provide a notable exception to this trend are the United Kingdom (UK) where rates of ecstasy have remained high and relatively unchanged from 1998 to 2005/06, and Germany and Greece where levels of use have not increased. Current statistics demonstrate that the prevalence of lifetime and recent ecstasy use among young adults (aged 15 to 34 years) in European countries ranges between 0.6 - 13.6% and 0.4 - 6.0% respectively, with the highest rates of use observed in the Czech Republic, Estonia, Spain and the UK (European Monitoring Centre for Drugs and Drug Addiction, 2005). In Australia, the number of Australians (over 14 years of age) who report both ever having tried ecstasy, and having used ecstasy in the past year has continued to steadily increase since 1988. In the 2004 National Drug Strategy Household Survey (NDSHS), one in eight (12.0%) of 20 to 29 year olds and 4.3% of 14 to 19 year olds reported past year ecstasy use (AIHW, 2005).

Data from the 2005 British Crime Survey indicates that for both young adults (16 to 34 years old) and also the broader adult population (16 to 59 years old), ecstasy has surpassed amphetamines to become the third most commonly used illicit drug after cannabis and cocaine (Roe & Man, 2006). This pattern has also been observed in a number of other European countries, and today in Australia, ecstasy is the third most widely used illicit drug behind cannabis and amphetamines (AIHW, 2005; European Monitoring Centre for Drugs and Drug Addiction, 2005)

2.5 Patterns of Use

An increase in research aimed at examining patterns of use among recreational users of ecstasy has occurred as a consequence of the rising rates of ecstasy use (particularly among younger people) and emerging evidence suggesting its neurotoxic potential in humans (Boot et al., 2000; Lyles & Cadet, 2003; Morgan, 2000). In the past 15 years, a number of studies reporting on patterns and harms associated with ecstasy use have been conducted in countries such as Australia (Black et al., 2008; Breen et al., 2004; Dunn et al., 2007; Solowij et al., 1992; Stafford et al., 2005; Stafford et al., 2006; Topp, Hando, Dillon et al., 1999), Italy (Parrott, Milani, Parmar, & Turner, 2001), the UK (Parrott et al., 2001) and the US (Klitzman et al., 2002; Strote et al., 2002).

The participants in these studies have primarily been obtained through purposive sampling or 'snowball' strategies. In the first of a number of Australian studies, one hundred ecstasy users in Sydney were interviewed about their patterns of ecstasy use and

experiences with the drug (Solowij et al., 1992). The majority (68%) of participants had used ecstasy on more than three occasions in their lifetime and were categorised as 'multiple time users', while the remaining third (32%) of the sample had used ecstasy between one to three times in their life. Almost one in five (18%) respondents reported that they only used ecstasy on 'special occasions' whereas one quarter used more frequently, and one third used ecstasy once a month to once every three months. Participants reported using ecstasy primarily at dance parties (72%), private parties (59%) and nightclubs (49%), with most respondents preferring to take ecstasy with a small (two to four people) or large (five or more) group of friends than on their own, thus supporting the assertion that ecstasy is perceived to be a social enhancer. In terms of the quantity of use reported, the majority (71%) of the sample reported taking typically one tablet per occasion of use, with one in five (20%) taking two or more and only a minority (9%) taking less than one tablet. However over half (59%) the sample also indicated that they had experimented with taking multiple tablets over extended periods of use. Swallowing was the predominant form of ecstasy administration among this sample, although small proportions did report experimentation with other routes of administration such as snorting, injecting and anal insertion. Significant proportions of the sample indicated that they currently also used other substances (defined as social or occasional use) such as marijuana (77%), amphetamines (47%), hallucinogens (38%), amyl nitrate (28%) and cocaine (26%). Furthermore, Solowij et al. (1992) stated that the majority (76%) of ecstasy users reported using other substances in combination with ecstasy, in order to extend or prolong the effects of the drug.

In a later study also conducted in Australia, the patterns of ecstasy use among a sample of current ecstasy users recruited from three Australian states were examined (Topp, Hando, Dillon et al., 1999). The participants in this sample had typically commenced ecstasy use in their late teens (median age 18 years), and most (89%) had used ecstasy on a regular basis (i.e. at least monthly) at some stage in their lives. In the six months prior to the interview, participants had used ecstasy on a median of 10 days. When examining quantities of use, almost half the sample reported that they 'typically' used more than one tablet per episode of use, with one quarter (25%) having taken four or more tablets in a single episode of use. The use of ecstasy during extended 'binge' episodes of drug use was also not unusual, with approximately one third (35%) of the sample reporting that they had used ecstasy continually for 48 hours or more in the previous six months. In similar findings to those reported earlier by Solowij et al. (1992), the predominant route of ecstasy administration was oral (94%), with smaller percentages reporting experimentation

with other methods of administration such as snorting, shelving/shafting (vaginal/anal insertion) and injection. The finding that polydrug use was extensive among this sample of regular ecstasy users was also consistent with the reports of Solowij et al. (1992) and numerous other studies that have reported on patterns of ecstasy use (Butler & Montgomery, 2004; Lenton, Boys, & Norcoss, 1997; Parrott et al., 2001; Schifano et al., 1998; Strote et al., 2002; Topp, Hando, Dillon et al., 1999). The authors reported that participants had taken a mean of 10 drugs in their lifetime, and the majority of participants used other drugs in combination with ecstasy (93%) as well as to facilitate the 'comedown' (87%). Alcohol, tobacco and cannabis were the drugs most likely to be used with ecstasy in this way.

A valuable summary of what is now known about patterns of ecstasy use is offered by the findings of an Australian study, the Ecstasy and Related Drugs Reporting System (EDRS). The EDRS is a monitoring study conducted by the National Drug and Alcohol Research Centre (NDARC) that has examined the patterns of ecstasy use in Australia since 2003 (Black et al., 2008; Breen et al., 2004; Dunn et al., 2007; Stafford et al., 2005; Stafford et al., 2006). The EDRS attempts, among other aims, to monitor patterns of use and harms related to ecstasy and other substances subsumed under the 'party drug' umbrella. The collective results over five consecutive years of this study provide insight into patterns of use associated with regular users of the substance, that importantly are congruent with those reported in the earlier Australian and also international studies.

Consistent with findings already examined, the data from the EDRS indicates that ecstasy use typically commences in the late teens to early 20s for most users. Although patterns of use have been shown to vary, ecstasy is primarily used recreationally on weekends, and the most common frequency of ecstasy use reported over time is between a monthly and fortnightly basis. Participants report typically using ecstasy at public venues such as nightclubs, dance parties and raves, although a significant proportion of users also report use of ecstasy at private parties, their friends' homes, and within their own homes. Over the past five years the majority of regular ecstasy users interviewed for the EDRS have indicated that they normally take more than one tablet per episode of use. Ecstasy users reported using a median of two tablets in a standard session of use, which can increase to three or four tablets in the 'biggest' episodes of use. Approximately half the EDRS sample each year has reported using four or more tablets in a single episode of use in the past six months, and the use of ecstasy in extended 'binge' episodes of use is also not uncommon. Although experimentation with various forms of administration has been

reported in the EDRS (and is also documented in other studies), swallowing remains the most common route of administration. Data from the EDRS indicates that although ecstasy is the primary drug of choice for most regular users interviewed in the study, ecstasy users are rarely sole users of this drug alone. Specifically, results from the past five years of this study support the assertion that ecstasy users are typically polydrug users with the majority of participants using other drugs in combination with ecstasy and also to facilitate the comedown. Cannabis, alcohol and tobacco are the substances consistently reported over time to be used in this way (Black et al., 2008; Breen et al., 2004; Dunn et al., 2007; Stafford et al., 2005; Stafford et al., 2006).

2.6 Ecstasy and Sexual Functioning and Behaviour

Popular belief suggests that ecstasy is a 'love drug' which possesses aphrodesic qualities and is able to enhance sexual experience (Holland, 2001). Although there is research available that supports this effect of ecstasy on the sexual functioning of humans, the picture emerging from a comprehensive examination of the scientific research is more complex than the drug's popular reputation. In the first published study to examine the effects of ecstasy on human sexual functioning, Buffum & Moser (1986) documented the responses of 76 ecstasy users to a detailed survey. The majority of males (97%) and females (76%) had taken ecstasy twice or more in their lifetime, with most (76%) reporting that they had not experienced adverse health or emotional consequences as a result of their ecstasy use. When asked directly about their sexual history, most participants (72% of women and 69% of men) reported having had sex under the influence of ecstasy, and also that the 'sensuality' of their sexual experience was enhanced by the use of the drug. In terms of assessing whether ecstasy use increased the propensity to initiate sexual activity, the results obtained were mixed. Specifically, approximately one third (34%) of both males and females reported that their interest in initiating sexual activity at times increased and at other times decreased as a result of ecstasy use, with similar proportions also reporting that ecstasy use either consistently increased, consistently decreased, or had no effect on their sexual desire. However when assessing the effect of ecstasy on their receptivity to sexual advances, approximately half (46%) the males and a third (34%) of females reported an increase in being receptive to being sexual while under the influence of ecstasy (Buffum & Moser, 1986).

Since these initial findings of Buffum and Moser (1986), a number of subsequent studies have also examined to varying extents the effects of ecstasy on aspects of human

sexual functioning and behaviour. In a recent literature review on the acute subjective effects of ecstasy, up to thirteen effects of ecstasy on sexual functioning, both desirable and adverse, had been documented (Baylen & Rosenberg, 2006). In support of Buffum and Moser's (1986) earlier findings, Baylen & Rosenberg (2006) reported that only one effect of the thirteen, that being sexual arousal or increased sensual awareness, was observed across five or more scientific studies. In a key study examining this effect, Zemishlany et al. (2001) recruited 15 female and 20 male healthy recreational ecstasy users who reported having used ecstasy prior to engaging in sex. A structured interview was used to evaluate the sexual function of participants whilst under the influence of ecstasy in respect to four domains: desire; erection in males/lubrication in females; orgasm and perceived satisfaction. The results were definitive in response to the effect of ecstasy on sexual desire, with all subjects reporting an increase in their level of sexual desire following ecstasy use, and all but one respondent rating this increase as moderate to profound.

In addition to the findings of this study and other research which suggest ecstasy increases sexual arousal in users (R. Cohen, 1995; Kalant, 2001; Zemishlany et al., 2001), there is also evidence that suggests ecstasy use is related to other positive effects on sexual functioning. For example, in an Australian study examining the sexual behaviour of 213 regular ecstasy users, Topp, Hando & Dillon (1999) documented that significant proportions of the sample reported that ecstasy improves sex (70%) and lowers inhibitions (67%). Similarly, Zemishlany et al. (2001) stated that the recreational ecstasy users in their study not only indicated that ecstasy has an enhancing effect on their sexual desire but also on perceived sexual satisfaction, with 93% of females and 90% of males retrospectively reporting an increase in their sexual satisfaction as a result of ecstasy use (Zemishlany et al., 2001).

More recently the findings of a qualitative study conducted in Northern Ireland have been published, wherein 98 current and former ecstasy users were asked about the effects of ecstasy on various facets of their sexual functioning and behaviour (McElrath, 2005). McElrath (2005) reported, in summary, that a number of participants believed that ecstasy enhances sexual relations by reducing sexual inhibitions or boosting sexual confidence. These findings are consistent with those documented in an earlier qualitative study (Beck & Rosenbaum, 1994) wherein the majority of ecstasy users interviewed also commented that ecstasy use resulted in a lowering of sexual inhibitions.

While the evidence reviewed above suggests that ecstasy use is related to enhanced sexual experience in some respects, there is also evidence that indicates ecstasy use is related to impaired sexual performance in others. For example, a recent cross-sectional study conducted in the US has examined the relationship between ecstasy use and related sexual risk-taking behaviour, with a specific focus on the role of touch and sexual characteristics related to ecstasy use (Theall et al., 2006). The results were based on the responses of a predominantly male (70%) and heterosexual (81%) sample of young adults (aged between 18 and 25), who had all used ecstasy a minimum of three times in the preceding 90 days. Almost half (46%) of the 268 respondents in this study believed that while ecstasy increased their sexual desire, it did not increase their ability to have sex, and that ecstasy use also made it harder to achieve orgasm (Theall et al., 2006). In addition to these findings a similar proportion (45%) of the Topp, Hando & Dillon (1999) sample reported that ecstasy had actually inhibited their sexual arousal and/or orgasm, with just over one in ten (12%) participants also indicating that they had experienced a loss of sex urge (in the preceding six months) as a result of ecstasy use. Furthermore, Zemishlany et al. (2001) in their research also documented that 40% of males reported ecstasy had had a negative effect on their erectile ability, and significant proportions of both males and females believed ecstasy had an inhibitory effect on orgasm latency. The results of Zemishlany et al. (2001) regarding the effects of ecstasy on erectile ability and ability to achieve orgasm in males are strikingly similar to those obtained in Beck & Rosenbaum's (1994) earlier study, and also to those of the original Buffum & Moser (1986) study, wherein 70% of men stated that ecstasy decreased their ability to orgasm and 46% stated it decreased their ability to achieve erection.

Although it appears that the effect of ecstasy on human sexual functioning varies, ecstasy for many users is primarily related to a lowering of sexual inhibitions. As such, it is not surprising that sexual risk-taking associated with ecstasy use has been identified as a problematic issue in the literature. The results from two independent studies that examined drug taking behaviours among American university students have implied an association between ecstasy use and one of the key behavioural markers of increased risk for contracting STIs; that is, having sex with multiple partners. Strote et al. (2002) examined the characteristics and associated behaviours of ecstasy users who were identified in their representative sample of over 14 000 college students. In comparison to university students who had not used ecstasy, those students who had used ecstasy in the previous year were more likely to have used marijuana, cigarettes, and to binge drink, and also to have had sex with two or more partners in the preceding month (Strote et al., 2002). Similarly Boyd et al.

(2003) documented in a sample of undergraduate students that when compared to peers who had no sexual partners, individuals who had five or more sexual partners were around nine times more likely to have ever used ecstasy and five times more likely to have used ecstasy in the past month.

In Australia, the EDRS project since 2004 has included a series of questions that investigate the sexual behaviour of participants in the six month period prior to interview. A concerning and consistent finding that has emerged over time from this data is the elevated level of risky sexual behaviour taking place amongst the regular ecstasy users surveyed (Black et al., 2008; Dunn et al., 2007; Stafford et al., 2005; Stafford et al., 2006). In each year of the study almost all participants report having had penetrative sex in the past six months, with more than half having sex with multiple (two or more) partners during this period of time (55% in 2004; 58% in 2005; 59% in 2006; 53% in 2007). When asked about the frequency of condom use with 'regular' sex partners, approximately three quarters of the participants who have had sex with a 'regular' partner also indicate the inconsistent use of condoms in this six month timeframe. Of additional concern is the finding that approximately half those participants who report having sex with 'casual' partners, also report inconsistent condom use with these sexual partners. Similarly, over three quarters of the sample in each year of the study indicated that they had recently had sex under the influence of substances such as ecstasy in the previous six months (79% in 2004; 82% in 2005; 85% in 2006; 88% in 2007). For those respondents who had engaged in this form of sexual risk-taking, the overwhelming majority had typically done so on more than one occasion during this period (86% in 2004; 88% in 2005; 90% in 2006; 89% in 2007).

In another Australian study, the HIV Risk-Taking Behaviour Scale (HRBS) (Darke, Hall, Heather, Ward, & Wodak, 1991) was administered as part of a large survey instrument to 213 regular ecstasy users in order to further assess the proposed relationship between ecstasy use and sexual risk-taking (Topp, Hando, & Dillon, 1999). Topp, Hando & Dillon (1999) first examined the general extent of sexual risk-taking among this sample and specifically compared levels of risk-taking participants engaged in whilst under the influence of ecstasy and not. In the month prior to interview, the majority (77%) of the sample had engaged in penetrative sex, and in the six months prior to interview almost half (49%) the sample had sex while using ecstasy. Of additional concern arising from this study was the fact that the reported levels of sexual risk-taking (as measured by the HRBS) among this group was similar to that observed for characteristically 'high-risk' samples such

as injecting opioid and amphetamine users (Topp, Hando, & Dillon, 1999). The results of multiple linear regression analysis indicated that ecstasy use specifically, as opposed to other substances, was associated with increased sexual risk-taking. Further analysis revealed that both sex without a condom and risky 'casual' sex were also more likely to occur after ecstasy use.

Additional evidence supporting the relationship between ecstasy use and increased sexual risk-taking is also available in the study conducted by Theall et al. (2006) described above. One of the key objectives of this study was to identify the predictors of overall sex risk behaviour among ecstasy users, with a focus on the relationship between frequency of ecstasy use and recent (past month) sex risk behaviour (Theall et al., 2006). Approximately one third (34%) of this sample had engaged in penetrative sex with two or more partners in the past 30 days, and 75% also reported having sex under the influence of alcohol and other drugs during this period of time. In the past month, the overwhelming majority (84%) of participants reported inconsistent condom use with their sexual partner or partners. A series of multivariate linear regressions were also conducted to identify the predictors of an overall level of 'sex risk' within the past month, based on a summative scale of a series of risky sexual activities. Theall et al. (2006) reported that after controlling for polydrug use and alcohol use, 'heavy' ecstasy use (having used more than ten times in past 90 days) remained a significant predictor of level of overall sexual risk-taking in this sample.

The prevalence of ecstasy use and its association with sexual risk has also recently been investigated amongst a primarily heterosexual sample of heroin, crack and cocaine users (Novoa et al., 2005). In this study, recent (past six months) ecstasy users were compared to non-current users on a number of dimensions, including sexual practices. Seventeen percent of the 534 participants interviewed had used ecstasy in the past six months. The results of the logistic regression analyses conducted revealed that compared to those who hadn't, participants who had used ecstasy in the previous six months were more likely to have had sex with two or more partners, and to have had their first sexual encounter before the age of 14 (Novoa et al., 2005). Furthermore, the relationship between ecstasy use and the measures of sex risk persisted after adjusting for other drug use (cocaine and marijuana), including being an injecting drug user.

The use of ecstasy has also more specifically been associated with various sexual behaviours that place individuals at increased risk for transmission of HIV and other STIs

in gay and bisexual male populations (Choi et al., 2005; Klitzman et al., 2002; Klitzman et al., 2000; Mattison et al., 2001; Waldo et al., 2000). In one of the first studies investigating this issue, Klitzman et al. (2000) distributed an anonymous questionnaire to gay and bisexual dance club attendees in New York City. 'High-risk' sexual behaviour was defined by the authors as having engaged in unprotected intercourse in the previous year. The results indicated a strong relationship between ecstasy use and high risk sexual behaviour, with ecstasy users almost three times more likely than non-users to report having had unprotected sex in the previous 12 months. Subsequently, after controlling for important demographic variables and all other substance use, the association between ecstasy use and sex risk remained statistically strong (Klitzman et al., 2000). In a similar study, Waldo et al. (2000) investigated the drug use patterns and correlates of sexual risk-taking in another sample of gay and bisexual men. Comparisons were made between two age groups, the first aged 15 to 17 years of age, and the second group between 18 and 22 years. The prevalence of ecstasy use was higher in the older as opposed to younger group of males, although in both age groups ecstasy was associated with unprotected anal intercourse (UAI). Choi et al. (2005) more recently explored which substances are associated with UAI specifically in a sample of young male adults who have sex with men. After demographic variables, club/bar and circuit party attendance and other features of sexual behaviour were controlled for, having been 'high' on ecstasy (in the past six months) remained significantly correlated with UAI in this sample (Choi et al., 2005). Similarly, in another study where the use of alcohol and other illicit drugs were statistically controlled, the relationship between ecstasy use and unprotected sex among gay men who attend circuit parties (Mattison et al., 2001) has also been shown to persist.

In summary, a clear association between ecstasy use and a number of sexual risk-taking behaviours has been established in the research literature. However, a major criticism directed at this body of research is that even though the data implies a general association between ecstasy use and 'risky' sexual behaviour, many of the studies conducted do not directly link ecstasy use with unsafe sexual practices in discrete sexual encounters. What is evident from this literature is that ecstasy users consistently relate use of the drug to enhanced sexual experiences and that even among typically 'polydrug' using samples, ecstasy use is identified as being uniquely associated with an increased risk of involvement in unsafe sexual behaviours over and above contributions identified for other drugs. With this design limitation acknowledged, this body of research therefore strongly suggests an association between ecstasy use and risky sexual behaviour.

2.7 Summary

The body of literature examined in this chapter first summarises the positive and negative effects associated with the use of ecstasy. The review also indicates that ecstasy is a popular drug of use in many parts of the world, particularly among young adults. In terms of its impact on sexual functioning, ecstasy has been associated with a number of both positive and adverse consequences, but overall is most commonly related to a decrease in sexual inhibitions and enhanced sexual experiences. Additionally, there is an accumulating body of research that links the use of ecstasy with increased levels of unsafe sexual behaviour, which expose individuals to the physical and psychological risks associated with risky sex. Research that aims to better understand the nature of the relationship between ecstasy use and sexual risk-taking by exploring potential mechanisms through which this relationship may operate, such as beliefs about the effects of ecstasy use on human sexual behaviour, has not yet been conducted.

CHAPTER THREE

Examining the Relationship Between Substance Use and Sexual Risk-Taking Behaviour

3.1 General Introduction

The belief that alcohol use is an effective substance for decreasing or loosening sexual inhibitions and increasing sexual desire and arousal is entrenched in popular culture. These beliefs are supported to some extent by the findings of experimental research that has examined the impact of alcohol on various aspects of the human sexual response (George & Stoner, 2000). In addition to enhancing sexual functioning, alcohol use has, however, also been shown to contribute to deleterious effects on the sexual responsiveness and performance of males and females (Markos, 2005; Peugh & Belenko, 2001). For example, Markos (2005) summarised studies that examined the pharmacological effects of alcohol on sexual arousal in males and females and found that an initial increase in genital responsiveness is then followed by eventual suppression (Markos, 2005). In an earlier review of this research, Peugh & Belenko (2001) concluded that with more frequent use and higher quantities of use, alcohol can actually reduce sexual desire and contribute to impaired sexual responsiveness and eventual sexual dysfunction. Therefore, although the scientific research indicates that alcohol use is generally associated with increased rather than diminished sexual responsiveness in humans, it also highlights that the relationship between alcohol and sexual behaviour is subject to a dose response phenomenon where initial potentiation of desire at low doses is followed by a reduction of arousal at higher doses.

A number of (often competing) frameworks have been presented in an attempt to account for the positive association between substance use and sexual risk-taking. Drawing on the established finding that alcohol use impairs several aspects of cognitive functioning, researchers initially endeavoured to understand the relationship between alcohol and risky sex as a direct consequence of alcohol's pharmalogical mechanisms. The inherent assumption of the pharmacological disinhibition framework is that the intoxicated individual is less likely to practice 'safe sex' due to the acute action of a psychoactive substance resulting in disinhibition, impaired information processing, and the diminished ability to calculate risk. 'Alcohol myopia' (Steele & Josephs, 1990) is one such

conceptualisation that seeks to explain the effect of alcohol use on human behaviour through causal biological mechanisms. According to alcohol myopia theory, alcohol intoxication diminishes an individual's cognitive capacity by reducing both the efficiency and scope of their information processing such that the individual focuses on cues most relevant or pressing in their environment. In the example of sexual situations or contexts, the cues most salient to the individual typically relate to the positive or desired outcomes associated with sexual contact. It then follows that distal cues which demand more complex processing (such as contemplation of the long-term consequences associated with unsafe sex, like contracting an STI or unplanned pregnancy) are less likely to enter the awareness of the intoxicated individual or, if they do, are not adequately processed. In short, when applied to sexual contexts alcohol myopia theory posits that the intoxicated individual experiences a 'myopic' view of their situation in which the impulses to engage in the risky sexual act are influential because the more distal inhibitions (i.e. risk of infection) against sexual disinhibition are incompletely processed.

While findings from the experimental literature have provided some support for a direct causal role of alcohol use on sexual risk-taking behaviour, empirical findings relating to the proposed effects of alcohol use on risky sex have not always supported such a link (for reviews see George & Stoner, 2000; Weinhardt & Carey, 2000). The failure of some studies to find a link between alcohol and sexual risk-taking has therefore challenged the pharmacological disinhibition hypothesis, which considers only a direct causal mechanism to account for this relationship. Following on from efforts to establish a causal relationship between biological effects of substance use and risky sexual behaviour came a body of research that aimed to account for the variations in findings by considering the importance of psychosocial factors, such as cognitive variables or beliefs. This chapter aims to review the research that establishes the relationship between substance use and elevated sexual risk-taking, and to also examine one of the major explanations currently used to account for the link between these behaviours. Firstly, this chapter examines some of the common ways in which sexual risk-taking has been defined in the research to date and presents recent data on rates of key sexual risk-taking behaviours in Australia and elsewhere. It then investigates the survey literature that explores the link between substance use and sexual risk-taking according to three levels of analysis: global association studies, situational association studies and event-level analyses. The outcome expectancy paradigm – which has contributed significantly to the current understanding of the cognitive factors that influence substance use – has more recently been applied to understanding disinhibited behaviours that occur when an individual is intoxicated. In the final section of this chapter,

the literature relating to outcome expectancies and disinhibited sexual behaviour resulting from substance use is reviewed.

3.2 Definitions and Rates of Sexual Risk-Taking

There are multiple definitions and forms of measurement of sexual risk-taking that exist in the literature. In the majority of studies to date, 'risky' sexual behaviour is typically operationalised via a cumulative scale (most commonly self-report) that includes a number of sexual behaviours that respondents can endorse. Sex without a condom (synonomous with 'unprotected sex') is widely considered a surrogate marker of risky sexual behaviour and therefore is included in most scales that measure sexual risk-taking. Additional measures or definitions of sexual risk-taking however can vary greatly between studies of this topic. For example, definitions of sex risk found in the literature have encompassed a broad range of sexual behaviours that include: sex with an intravenous drug user (Biglan et al., 1990; Fontaine, 1994; Miller et al., 2004; Trobst, Herbst, Masters III, & Costa Jr, 2002; Trobst et al., 2000); oral sex (Fontaine, 1994; McCown, 1991); anal sex (Biglan et al., 1990); having a one night stand (Fontaine, 1994); receiving money or drugs in exchange for sex (Ball & Schottenfeld, 1997; Gillmore, Butler, Lohr, & Gilchrist, 1992; Trobst et al., 2000; Waldo et al., 2000); early age of sexual initiation (Miller et al., 2004); unplanned sexual encounters (Poulin & Graham, 2001) and having sex with more than one partner over a specified time frame (Ball & Schottenfeld, 1997).

The divergence in methods of defining sexual risk-taking has attracted a considerable amount of methodological criticism for what is now a substantial body of literature (Leigh & Stall, 1993; Stall & Leigh, 1994). This is primarily due to the significant difficulty experienced in attempts to compare rates of sexual risk-taking across time, populations and geographic location. Such difficulty has hindered not only international comparisons but also comparisons between studies conducted in Australia. Despite the variations that exist and their associated limitations, there are some key forms of sexual risk-taking behaviour that are generally recognised as increasing an individual's chance of experiencing one of the adverse outcomes associated with risky sex and a review of these follows. This review will also consider one form of sexual risk-taking behaviour related to substance use that has been relatively under-researched thus far and is a key behavioural focus in the current research – unintended sexual encounters.

3.2.1 Unprotected Sex

The use of condoms is a widely recognised and effective method of minimising the infection risk associated with sexual activity. Despite the widespread and ongoing attempts of public health campaigns, unprotected sex or sex without a condom remains a significant problem among sexually active people. The research currently available suggests that among the adult population in Australia, condom use is generally inconsistent (de Visser, Smith, Rissel, Richters, & Grulich, 2003b, 2003c; Grulich, de Visser, Smith, Rissel, & Richters, 2003a; Grulich et al., 2003b; Van de Ven, Rawstorne, & Treloar, 2002; Van de Ven, Rawstorne, Treloar, & Richters, 2004). The strongest evidence for this assertion draws on data from the Australian Study of Health and Relationships (ASHR). Conducted between May 2001 and June 2002, the ASHR is considered internationally to be one of the largest national sex surveys and is also the largest representative sample survey of sexual health behaviour carried out in Australia to date. The results of the ASHR are based on a representative sample of 10 173 men and 9134 women (ranging from 16 to 59 years old) who completed computer-assisted phone interviews (Smith, Rissel, Richters, Grulich, & de Visser, 2003). Within a broader attempt to collect information on a wide range of sexual behaviours and knowledge of risks associated with sexual activity, the study also examined the frequency of 'risky' sexual practices and identified the demographic characteristics associated with such practices. One of the behaviours of interest in these analyses was the rate and pattern of condom usage in the sample. The results from the ASHR revealed that fewer than half those people who were sexually active in the year prior to being interviewed had used a condom in that 12 month period (de Visser et al., 2003c) and that the consistency or frequency of condom use is strongly associated with the nature of the relationship between sexual partners. Specifically, condom use was demonstrated to be more likely with 'casual' sexual partners and less likely with 'regular' or 'live in' partners. Other Australian studies examining young adults in particular have supported these patterns of findings (AIHW, 2003; Van de Ven et al., 2002; Van de Ven et al., 2004). For instance, data collected on the sexual practices of first year students aged 17 to 19 attending a Sydney university (from 1996 to 1999) indicated that although a majority (between 50% to 69%) of participants always used condoms with 'casual' partners, significantly fewer respondents reported doing so with their 'regular' partners (between 24.1% to 35.3%) (Van de Ven et al., 2002). More recently, the results of a convenience sample survey based at another Sydney university between 2002 and 2003 provided additional support for these findings (Van de Ven et al., 2004). Within this study an average of 63% of participants who had sex with a 'casual' partner in the past six months reported using condoms 'everytime',

while 47% of students who had sex with a 'regular' sex partner (in the past month) reported doing so.

In heterosexual populations, condom use is generally associated with contraception while efforts to protect oneself from HIV and STIs appear to be related to the perceived duration of the sexual relationship (Corbin & Fromme, 2002). The consistent observation that among young heterosexual adults in particular, condoms are infrequently used in the context of having sex with a 'regular' partner has raised additional concern, given the subjective nature of the definition of a 'regular' relationship. Also concerning is that the evidence indicates it is common practice among young adults to report having had sex with multiple partners, whom some may identify or qualify as a 'regular' partner, within a limited timeframe. Therefore, by engaging in a series of monogamous relationships without the use of condoms, individuals may experience repeated exposure to multiple serial partners and in turn, increased risk for HIV or other STI transmission.

Although the use of condoms is known to be a reliable method of protection against the risks associated with sexual activity, even the consistent use of condoms is not completely effective in preventing infection when used in sexual intercourse. For example, approximately one quarter (23.8%) of men who had used condoms in the year prior to being interviewed for the ASHR experienced at least one condom breakage in that timeframe and almost one in five (18.1%) experienced at least one condom slippage in this period (de Visser, Smith, Rissel, Richters, & Grulich, 2003a). It is also important to note, therefore, that although condom use can reduce risk, the frequency of intercourse is also presumably associated with the risk of infection and this behaviour has also been conceptualised as a measure of sexual risk-taking in the literature (de Visser et al., 2003b, 2003c).

3.2.2 Multiple Sexual Partners and 'Casual' Partners

Along with conscientious condom use, limiting sexual activity to a single partner is another highly recommended strategy for managing the physical risks associated with sexual activity. Relevant statistics however indicate that the sexual practices of humans often extend to multiple partners and the likelihood of having sex with a number of partners has been associated with certain demographic variables. For example, it is an established finding that men, regardless of their sexual orientation, are more likely than women to report a greater number of sexual partners (de Visser et al., 2003b). Age has also been associated with likelihood of having sex with multiple partners in a specific

timeframe. Employing data from the ASHR, 15.5% of all men and 8.4% of all women who were sexually active in the year prior to being interviewed reported multiple heterosexual partners in this timeframe. Analyses indicated that the likelihood of having had sex with multiple partners is greatest during young adulthood, with younger respondents (i.e. those aged between 16 to 29) more likely to report having sex with more than one partner in the recent past than older (i.e. those aged 30 or over) participants (de Visser et al., 2003b). Similar patterns relating to high rates of multiple sexual partners among young adults have also been reported in other studies. For example, data from Van de Ven et al. (2002) showed that approximately one third of all first year students (aged 17 to 19) reported having two or more sexual partners in their lifetime so far. More recently these findings were supported using samples of first year university students (under the age of 21) also from Sydney, Australia (Van de Ven et al., 2004). Almost one in four (39.3%) of those students surveyed in 2002 reported having had multiple partners and around one third (32.4%) in 2003 reported having done so. Comparable results have also been observed in other countries. For example, in an American study that employed a sample of 18 to 24 year olds recruited across three universities, over half (58%) of the entire sample had had sex with two or more people in past six months (Baskin-Sommers & Sommers, 2006). These findings become particularly concerning when considered in light of the inconsistency of condom use among the sample, with 35% of sexually active individuals in this study also reporting that they had failed to use condoms at least once in that same period of time (Baskin-Sommers & Sommers, 2006).

Number of sexual partners has also been found to vary according to sexual orientation. For example, in the ASHR homosexual identified men and women reported higher numbers of sexual partners in total compared to their heterosexual counterparts (Grulich et al., 2003a). More specifically, approximately one quarter (26%) of homosexually identified men reported more than 10 partners in the past 12 months, compared with 4.6% of bisexually identified men, and less than 0.1% of heterosexual men. Similarly, when comparing risk behaviours according to sexual orientation in a sample of regular ecstasy users, homosexual and bisexual males and females were significantly more likely than heterosexual males and females to report an increased number of sexual partners (Degenhardt, 2005).

In addition to concurrent substance use, there are other situational variables that have been identified as increasing the risks associated with sexual activity. Having sexual intercourse with strangers, 'casual partners' and/or sex with a member of 'high-risk' groups

for HIV infection (such as intravenous drug users and prostitutes) are acts that carry significant risk. Not only do these behaviours involve the usual risks of HIV and STI transmission and unwanted pregnancy, but it has been suggested they also pose elevated risk for the experience of interpersonal violence or assault (Hoyle et al., 2000). Despite the identified risks associated with having sex with a 'risky' partner, significant proportions of young adults and also adolescents (Biglan et al., 1990) report having engaged in this behaviour. In Australian data, approximately one quarter of first year university students reported having sex with a casual partner in the previous six months (Van de Ven et al., 2004). Similar results were obtained in an American study where, in a sample of unmarried sexually active people in their 20s, one quarter (25%) had had sex in the past year with an individual who was not well known to them (Arnett, 1998). Higher rates have been observed in more representative samples of young adults recently: in a random sample of almost 3000 heterosexual men and women aged between 16 and 24 years of age, Brodbeck et al. (2006) reported that 40.9% had had sex with a 'casual' partner in past 12 months.

3.2.3 Unintended and Unplanned Sexual Encounters

The forms of sexual risk-taking that have dominated the literature thus far focus specifically on behaviours that place people at increased risk for the physical consequences of unsafe sex. These outcomes may also pose negative psychological outcomes associated with the physical risk, such as adjusting to life with a diagnosis of HIV or the emotional consequences of an unexpected pregnancy. However, another form of sexual risk-taking, unintended or unplanned sexual encounters, also poses significant psychological consequences for some individuals in the form of shame and embarrassment. Unintended sexual encounters represent an important aspect of sexual risk-taking that has been under-researched to date. In addition to the increased risk that these encounters pose in themselves, Poulin & Graham (2001) reported that unplanned sexual intercourse under the influence of alcohol or other drugs was also found to be a strong independent risk factor for a constellation of other risky sexual behaviours, such as having sex with multiple partners and inconsistent condom use among adolescent males and females. The research reported in this thesis will therefore also examine this aspect of risky sexual behaviour.

3.3 Substance Use and Sexual Risk-Taking: A Review of the Literature

The co-occurrence of substance use and sexual behaviour is widely documented. In addition to the extensive body of research that has examined the relationship between alcohol use and sexual risk-taking, there is also an increasing body of evidence that

documents a positive relationship between the use of a number of illicit drugs and an increased likelihood of engaging in several of the key measures of sexual risk-taking reviewed above. As a result of obvious ethical limitations and pragmatic constraints, it has not been possible for researchers to conduct controlled experiments that examine the influence of substance use on human sexual behaviour in a natural setting. The research related to the substance use-risky sex link therefore relies on non-experimental, survey based methodology to assess whether substance use is associated with sexual risk-taking. There are three key research strategies that have been utilised when exploring the substance use and risky sex relationship: global association studies; situational association studies; and event-level analyses. In the following review each of these methodologies are defined before a discussion of the research findings for each level of analysis is presented. This framework is derived from Leigh & Stall's (1993) review of the link between substance use and sexual risk-taking. Importantly, the limitations of each of the three levels of analyses are also considered in this review.

3.3.1 Global Association Research

Global association studies represent the most basic of the forms of analysis in the literature that examines the relationship between substance use and risky sexual behaviour. In a prototypic global association study participants are asked about the frequency (and sometimes, quantity) of their substance use and also respond to questions that assess their level of involvement in various risky sexual behaviours within a specific timeframe. These sources of information are then correlated in order to determine whether a statistical association exists between the two variables of interest.

In a review of global association studies focussing on alcohol use, the evidence generally supports a positive association between alcohol use and sexual risk-taking behaviour (Cooper, 2006; George & Stoner, 2000; Graves & Leigh, 1995; Halpern-Felsher, Millstein, & Ellen, 1996; Leigh & Stall, 1993; Weinhardt & Carey, 2000). For example, using a nationally representative sample of young adults Graves & Leigh (1995) examined patterns of alcohol use and sexual behaviour in the previous 12 months. Their results indicated that those individuals who frequently drank alcohol, who reported having five or more drinks per occasion of alcohol use and who had reached intoxication on some episodes of drinking, were not only significantly more likely to have been sexually active, but were also more likely to have had multiple sexual partners in the past year. Additionally, after controlling for important demographic variables (such as gender and age) the inconsistent use of condoms was also positively related to heavy drinking within this

timeframe. More specifically those young adults who had consumed five or more drinks in one episode in the previous 12 months were half as likely to have always used condoms as those young adults who did not use alcohol.

Recently, global association studies have also identified a positive correlational relationship between the use of illicit drugs and a number of health risk factors associated with unsafe sexual practices such as the contraction of STIs (Khan, Hussain, & Schofield, 2005; Radcliffe, Ahmad, Gilleran, & Ross, 2001; Ross & Radcliffe, 2006; Wilson, Minkoff, DeHovitz, Feldman, & Landesman, 1998). For instance, the incidence of gonorrheal infection in a sample of men and women presenting to an urban sexual health clinic was conducted in a UK study employing a case control research design (Ross & Radcliffe, 2006). The results of the preliminary analyses indicated that infection with gonorrhea was positively associated with a history of illicit drug use. In subsequent multivariate analyses, a positive association between drug use and a number of other sexual behaviour variables that would increase the risk of infection (such as increased number of casual partners and also foreign partners) was also revealed. Further evidence of this association has also emerged in a population based study recently conducted in Australia. Among almost 10 000 females in a 'high-risk' age group (22 to 27 years), Khan et al. (2005) examined the correlates of having been diagnosed in the past four years with chlamydia, herpes and/or genital warts. Similar to the results obtained by Ross and Radcliffe (2006), a history of illicit drug use was significantly related to increased risk for contraction of all three STIs examined (Khan et al., 2005). Importantly, this relationship also persisted after statistical adjustment for several other behavioural risk factors (such as binge drinking and the experience of partner violence) that had previously been implicated in this relationship and, also importantly, after adjustment for sexual variables such as the age of first intercourse and regular condom use for contraception.

In addition to findings that document an association between a history of illicit drug use in general and increased risk for contracting STIs, some global association studies have also identified relationships between specific drugs and the acquisition of an STI. For example, in an American study it has been reported that rates of STI incidence and the acquisition of new STIs in a sample of heterosexual women were uniquely associated with the use of crack cocaine (Wilson et al., 1998). Increases in the frequency of crack cocaine use were measured by comparing the average use over a weekly timeframe (on a scale of one to seven ranging from 'Never' to 'More than four times a day') at two points of assessment, 12 months apart. Wilson et al. (1998) found that increases in the frequency of

crack cocaine use over the past year were found to be positively associated with rates of new STIs and this relationship was independent of whether participants identified as HIV positive or negative at that time. Similarly, in a multi-national study examining the risk factors for HIV seroconversion in a sample of homosexual men who received a positive diagnosis of HIV between 1982 and 1994, amphetamine use was shown to be a risk factor for HIV seroconversion even after controlling for the number of sexual partners (Page-Shafer et al., 1997). This finding is consistent with the results of other studies that have examined gay and bisexual male populations, which have found that substance use in general is statistically associated with increased rates of unprotected anal intercourse (UAI) as well as HIV seroconversion (Choi, Coates, Catania, Lew, & Chow, 1995; Choi et al., 2005; Colfax et al., 2001; Colfax et al., 2004; Mattison et al., 2001; McKirnan, Vanable, Ostrow, & Hope, 2001; Page-Shafer et al., 1997; Ruiz, Facer, & Sun, 1998; Volk et al., 2006).

Building on research that identifies a positive association between the use of illicit substances and the acquisition of STIs, it has also been demonstrated that the use of substances other than alcohol are also directly associated with sexual practices known to contribute to the transmission of HIV and other STIs. For example, in the case of cannabis, global association studies have typically supported a positive association between cannabis use and a number of measures of sexual risk-taking (Brodbeck et al., 2006; Graves & Leigh, 1995; Poulin & Graham, 2001). In a study conducted recently, Brodbeck et al. (2006) examined the relationship between cannabis use and sexual risk-taking behaviour in a randomly selected sample of almost 3000 young Swiss adults with a mean age of 20 years. The results of the analysis revealed that those participants who used cannabis at least weekly in the past month had engaged more often in sexual risk-taking behaviours (for example having sex with casual partners, having multiple partners) over the past year than their non-cannabis using counterparts (Brodbeck et al., 2006). Also, when the results were examined according to gender, 'regular' cannabis using males were twice as likely to have engaged in sexual risk behaviours compared to males who hadn't used cannabis, and females who used cannabis regularly were three times more likely than non-cannabis using females to have done so. Likewise, Graves and Leigh (1995) also reported that young adults who had used cannabis 'sometimes' in the past year were four times more likely to have had multiple sexual partners in the past 12 months than those who had never tried cannabis.

However, not all global association studies have supported an association between cannabis use and increased sexual risk-taking (Baskin-Sommers & Sommers, 2006). Baskin-Sommers & Sommers (2006) examined the co-occurrence of a number of substances with eight 'high risk' behaviours, including two measures of sexual risk-taking (multiple partners and no condom use), in a sample of college students. Although the use of cannabis in the prior six months was not observed to be related to sexual risk-taking in this study, the use of other substances, namely alcohol and methamphetamine, was significantly related to not using a condom in the prior six months. Furthermore, in subsequent analyses the results of a logistic regression supported a strong relationship between the co-occurrence of alcohol and methamphetamine use and non-use of condoms. This relationship persisted even after demographic factors, general frequency of substance use and participants' level of involvement in other measures of risk-taking had been accounted for.

Further to the finding that there is an association between substance use and sexual risk-taking in samples of college students and young adults, it has also been established that adolescents who use substances are more likely to engage in risky sexual behaviours than those who don't (Biglan et al., 1990; Poulin & Graham, 2001). Based on the analyses of two samples of high-school students, Biglan et al. (1990) reported that those adolescents who used alcohol, cigarettes and illicit drugs were also more likely to have been involved in high-risk sexual behaviour in the preceding year. More recently, as part of a larger drug use survey completed by almost 10 000 high-school students in Canada, four sexual outcome variables (having had sexual intercourse, unplanned intercourse, multiple partners and inconsistent condom use) were explored in relation to the influence of substance use (Poulin & Graham, 2001). Again a strong global association between substance use and risky sexual behaviour was established. Specifically, the likelihood of having been sexually active in the past year was shown to increase between two to three times with a parallel increase in the frequency of alcohol and cannabis use, ranging from no use to having used more than once a month. When examining the specific relationship between unplanned sexual encounters and substance use, logistic regression analyses also revealed a strong relationship between this measure of sexual risk-taking and increasing frequency of alcohol and cannabis use. Poulin & Graham (2001) also reported that cannabis use was shown to be an independent risk factor for having had multiple sexual partners in the past 12 months. Contrary to established findings that alcohol use is associated with sexual risk behaviour, this study failed to establish any measure of alcohol use (being drunk, binge drinking or frequency of use) as an independent risk factor for having had multiple sexual partners.

In summary, the global association literature strongly suggests that individuals who use alcohol and other substances are more likely to engage in risky sexual practices than their non-substance using peers. There are several shortcomings related to this literature however that must be considered when drawing inferences regarding the relationship between substance use and sexual risk-taking from its findings. By definition, global association studies measure only general patterns of substance use and do not assess the frequency of substance use specifically in combination with sexual encounters. Therefore, although the findings from global association studies are able to implicate a broad pattern of co-variation between substance use and sexual risk-taking behaviour, the findings of this literature do not allow for the determination that the substance use and risky sexual activity occurred in the same episode. Given that global association studies are unable to demonstrate whether substance use may have a direct effect of risky sexual behaviour they consequently have questionable relevance for inferring causality. It is possible, for example, that a chronic methamphetamine user may frequently engage in high risk-sexual behaviours but that these practices occur at times when methamphetamine use is not involved. The results of global association studies can be equally well explained through 'third variable' explanations, for example by hypothesising that an underlying propensity towards risk-taking leads individuals both to use substances and have 'riskier' sex (Leigh & Stall, 1993).

3.3.2 Situational Association Studies

If the aim of research is to investigate the direct effects of substance use on unsafe or risky sexual behaviour, it is critical to establish whether the use of substances are consumed proximal to the 'risky' sexual act. Studies that have employed a situational association design represent an improvement over global association methodology in this regard. In situational association studies, an assessment of whether an individual has engaged in sexual activity while under the influence of substances is related to a measure or index of sexual risk-taking behaviour. In this design, measures of substance use generally consist either of questions regarding how often the respondent has engaged in sex while using alcohol or other substances or alternatively employ a dichotomous measure that ascertains whether or not an individual has engaged in sexual activity while under the influence of substances. Similarly, when measuring sexual risk-taking, participants may respond to an item assessing the frequency of their engagement in high-risk sexual activities or answer an item that asks whether they have engaged in a particular 'risky' sexual act in a specified period of time. For example, in a typical situational association study, the frequency of unprotected intercourse over a time period (i.e. 'How many times have you had sex without a condom in the past six months?) may be correlated with the frequency of

use of a particular substance in combination with sexual activity in the same time period (i.e. "How many times have you had sex under the influence of ecstasy in the past six months?) to see if a statistical association exists between the two behaviours for the same time period.

The number of published studies employing situational association design is small when compared to the research findings that employ global association or event-level analyses. To date, the findings of studies that have employed situational association methodology have provided less consistent support for an association between alcohol – the substance that has received the majority of research attention in the investigation of this relationship – and sexual risk-taking. To demonstrate, Corbin & Fromme (2002) reported that in a sample of American college students the frequency of having sex while intoxicated on alcohol in the preceding month was positively associated with using a condom in sexual encounters that involved a new, and not regular or established sexual partner. In direct contrast to these findings, in a homosexual male sample from the US it was found that having sex after consuming alcohol was positively associated with condom use for sex with a steady partner and negatively related to condom use for sex with a new partner (Seage et al., 1998). Contrary to expectation, Graves & Leigh (1995) actually reported a positive association between the incidence of sex under the influence of alcohol and condom use in another American study – individuals who had reported a higher number of sexual encounters while intoxicated were more likely to use condoms than individuals who did not drink in combination with sexual activity.

Inconsistent findings have also been published in studies that have used situational level analysis to examine the relationship between alcohol use and sexual behaviour among adolescents. Hingson et al. (1990) reported that sixteen percent of adolescents who indicated that they had had sex under the influence of alcohol in the past six months reported using condoms less frequently in sexual episodes when they had been drinking, compared to sexual episodes where they had not consumed alcohol. Furthermore, it was found that adolescents who drank heavily (averaging five or more drinks daily) were approximately three times less likely to have consistently used condoms in the previous year, compared to adolescents who did not drink (Hingson, Strunin, Berlin, & Heeren, 1990). The results from a study of this issue among pregnant adolescents presents a contrast to these findings. Although the results of the initial bivariate analysis supported a relationship between alcohol use and a composite measure of sexual risk-taking, this effect disappeared when other variables (such as a measure of delinquency) were statistically

controlled for (Gillmore et al., 1992). In spite of the inconsistencies that exist in this literature, two key reviews of the relationship between alcohol use and unsafe sexual behaviour tend to support this proposed relationship. Specifically, in situational association studies that relate to alcohol use, substantial proportions of the individuals assessed reported consuming alcohol proximal to having sex (George & Stoner, 2000) and, overall, individuals who used alcohol prior to having sex tended to engage in higher levels of risky sexual behaviour (Weinhardt & Carey, 2000).

The relationship between the use of illicit drugs and sexual risk-taking behaviour has also been examined in some studies employing a situational association methodology. These studies have typically supported a positive association between the use of drugs other than alcohol and unsafe sexual behaviours but it is important to note that this body of research is relatively small. In the past, this research has tended to focus on gay and bisexual male populations and on other groups believed to be at elevated risk for contraction of HIV and other STIs. For example, O'Campo and colleagues (1992) explored the potential relationship between protective or risk-reduction sexual practices and having received a prior diagnosis of an STI among pregnant women from a disadvantaged socio-economic background. No relationship was observed between having had an STI in the past and current preventative sexual practices. However, findings did indicate that using drugs in combination with sex was statistically associated with lower levels of 'safe' or preventive sexual practices in the previous year (O'Campo et al., 1992). In related research, a longitudinal study examining psychological factors associated with successful or unsuccessful change in maintaining safe sex practices among gay men who had completed a risk reduction intervention was conducted. The authors found that those men who reported using substances prior to sexual activity at least once in the previous four months were more likely to begin engaging in high risk behaviour again than those who hadn't been intoxicated when having sex (Kelly, St Lawrence, & Brasfield, 1991). In light of these findings, it is not surprising that subsequent research has established the 'dual epidemic' of drug use and risky sexual behaviour in the literature related to bisexual and homosexual males. For example, Choi and colleagues reported that the use of substances during sex was associated with being five times more likely to report unprotected anal intercourse (UAI) among gay men (Choi et al., 1995). Additionally, in a more recent study also conducted by Choi and colleagues, strong statistical associations were observed between being high on substances (specifically ecstasy and amyl nitrate) during sex and having UAI in the previous six months (Choi et al., 2005).

To conclude, the data resulting from situational association analyses support an association between substance use and unsafe sexual behaviour. Situational association studies improve upon global association findings as they examine effects from the use of drugs during sexual events. However, the temporal relationship between alcohol and other drug use and risky sexual behaviour is still clouded and there are key limitations associated with this methodology that should be acknowledged. Situational association studies do not specifically address whether the sexual encounters characterised by their 'risky' nature were the same occasions at which alcohol or drugs were involved. It is possible that an individual may have had sex four times under the influence of methamphetamine in the past six months and they may have had unprotected sex four times in the same time period, yet this does not allow for the conclusion to be drawn that the two co-occurred. Leigh & Stall (1993) suggest that the inferences that can be drawn from situational association data are limited – it is possible, they argue, that the relationship of substance-use-with-sex to risky behaviour may in reality be an artefact of the relationship between the total amount of sex and total amount of risky behaviour reported in the timeframe of interest. Although being more specific than global association data, these results still do not indicate whether sexual risk behaviour occurred during the same occasion as alcohol or drug use. Therefore it cannot be concluded from situational association studies whether or not people are less likely to practice safer sexual acts after substance use.

3.3.3 Event-level Analyses

Event-level analyses represent the most specific and detailed examination of the hypothesis that substance use prior to and during sexual activity leads to elevated levels of risky sexual behaviour. This method of analysis refers to a detailed examination of the characteristics of a discrete sexual episode(s) or event. Two levels of event-level analyses exist; critical-incident and multiple-event studies. In critical-incident studies the details of between one to three specific sexual events are examined (Weinhardt & Carey, 2000). For example, a participant may be asked to respond to a number of questions relating to their last sexual encounter, such as whether they used a condom, whether they used substances (and how much) prior to the sexual act, and the nature of the relationship between themselves and their partner (i.e. was the sexual partner relatively unknown or a well-know 'regular' partner?). In multiple-event studies participants are asked to respond to questions regarding all of their 'recent' sexual encounters which allow for conclusions to be drawn from a more representative sample of sexual behaviour. Additionally, in some studies that employ critical-incident or multiple-event levels of analyses, a within-subjects examination of whether an individual's sexual behaviour or level of 'risk' changes as a function of being

intoxicated or not is also conducted. The findings from event-level analyses are therefore able to address the major criticism surrounding global and situational association studies by establishing the co-occurrence of substance use and 'risky' sexual behaviour during the same episode.

In relation to alcohol use, although findings from event-level analyses can be inconsistent at times, overall this literature suggests there is a positive relationship between alcohol use and increased levels of unsafe sexual behaviour in at least some domains. Several of the conclusions drawn from Weinhardt & Carey's (2000) comprehensive review of the alcohol and risky sex link from the event-level method of analysis are indicative of this. When focussing on condom use as the outcome measure of 'unsafe' sexual behaviour among adult samples, Weinhardt & Carey (2000) concluded that little evidence is available to suggest that being intoxicated on alcohol during sex affects the likelihood that condoms will be used. In general, it appears that adults who do not tend to use condoms in sexual encounters where they have not been drinking, are similarly not likely to use them in sexual encounters where they have been drinking. However, Weinhardt and Carey (2000) also concluded that adolescents whose first sexual experience occurs under the influence of alcohol appear to be less likely to follow safe sex practices and use condoms and that females (but not males) are more likely to engage in sexual acts with a less well known partner when they are intoxicated compared to when they are not. Since then, Leigh (2002) conducted a meta-analysis of 26 studies that examined the relationship between alcohol and condom use in specific sexual encounters. Due to the heterogeneity observed among odds ratios when the whole group analyses were performed, Leigh (2002) examined the results according to three types of sexual encounter (first sexual experience, most recent sexual experience, and the most recent sexual encounter with a new sexual partner) and also as a function of age, with separate analyses for studies of adolescents and adults. The association between alcohol use and condom use was found to vary according to the type of sexual episode. Firstly, the results indicated that drinking was associated with decreased condom use at the first sexual encounter. Secondly, among adolescents a general trend towards having unprotected sex when intoxicated was also observed. Based on the findings relating to adults however, the use of alcohol appeared overall to be unrelated to condom use in both recent sexual encounters and in recent encounters with a new sexual partner (Leigh, 2002).

Event-level analyses of the relationship between alcohol use and risky sex have been shown not only to vary according to the type of sexual encounter, but also according

to the relationship status between those involved. In a sample of sexually active American college students, a recent examination of the relationship between alcohol use and unprotected vaginal sex found that alcohol use was associated with increased rates of unsafe sex for sexual encounters involving a non-steady or casual partner (J. Brown & Vanable, 2007). In the same study, however, this finding was not observed for those sexual encounters that examined the use of condoms with a steady sexual partner.

Event-level data have more clearly supported a relationship between the episode specific use of certain drugs (such as amphetamines and cocaine) and sexual risk-taking among bisexual and homosexual males (Colfax et al., 2004; McNall & Remafedi, 1999; Molitor, Truax, & Ruiz, 1998). Given that this population faces significant risk for HIV infection and that a global association between the use of substances and unsafe sexual behaviour among this population has been firmly established, subsequent research has since attempted to explore the behavioural risk factors associated with 'high-risk' sexual events resulting in HIV seroconversion. In Australia for example, Volk et al. (2006) surveyed 103 gay and bisexual men who had recently received a diagnosis of HIV about the specific sexual event that they believed led to their seroconversion. Of the 95 men who were able to identify a 'high risk' event, a high proportion (62%) reported the use of alcohol and/or recreational drugs rates at that event, with a significant number reporting the use of multiple substances (Volk et al., 2006). In a more detailed analysis of this association, the event-specific relationship between the use of psychoactive substances and unprotected sex with an HIV positive or unknown HIV status partner was documented in a large cohort of HIV negative gay and bisexual men. Specifically, Colfax et al. (2004) found that heavy alcohol use and the use of amphetamines, cocaine or amyl nitrate proximal to sexual intercourse was significantly associated with increased risk of unprotected anal sex (UAI) with a HIV positive or unknown serostatus partner in the previous six months.

It is important to note that within some studies that have failed to find event-level relationships between alcohol use and unsafe sex, an event-level association between the use of other drugs and inconsistent condom use has been found. Temple, Leigh & Schafer (1993), for example, employed event-level methodology to examine the relationship between alcohol use and unprotected sex in a representative household population. The sexual event of interest in this study was the participants' most recent sexual encounter with a new sexual partner – the results failed to support an association between alcohol use and unprotected sex at this level. Based on this finding, Shafer et al. (1994) later re-analysed

the data to assess whether the use of drugs other than alcohol influenced the use of condoms for this particular sexual event. Interestingly, the results of this analysis indicated that in the general population those who reported using drugs in their most recent sexual episode with a new partner were almost three times more likely to not have used a condom in that sexual encounter than those who had not. In addition, although the results of Leigh's (2002) meta-analysis did not support an association between alcohol use and risky behaviour among adults, the analysis did support an association between the use of other substances – either alone or in addition to alcohol – and inconsistent condom use. The studies involved in Leigh's (2002) meta-analysis, however, did not identify to which drugs in particular this relationship applied.

To conclude, the results of event-level analyses provide perhaps the strongest evidence for a direct relationship between alcohol and other substance use and risky sexual behaviour by addressing the primary criticism of global association and situational association methods. By establishing that substance use and sexual risk-taking co-occur at the same point in time, the findings of event-level analyses strengthen the hypothesis that substance use causes unsafe sexual behaviour. However, the possibility that confounding variables relating to enduring features of the individual – such as aspects of their personality – can also explain this relationship are not able to be eliminated in a cross-sectional design. Many researchers have argued, for example, that a pre-existing disposition towards risk-taking behaviours may influence both the use of substances and engagement in risky sexual activities. This general disposition towards engagement in a number of risky behaviours may exert its influence not only at a global level, but also within discrete events such as those assessed in event-level research.

3.3.4 Summary

A positive relationship between substance use and an elevated risk for involvement in risky sex is established when the findings from the three levels of analysis examined in this review are considered collectively. Although the majority of studies in this literature have supported an association between these two behaviours at some level, there are also a number of studies that have failed to find a relationship between specific measures of substance use and certain measures of 'risky' sexual behaviour. The inconsistencies in results that have at times been observed across studies are able to be understood in part due to differences in methodology, such as contrasting methods of assessing substance related risky sex, and also due to inherent differences between the populations examined (Stall & Leigh, 1994). Although the research overall supports a relationship between

substance use and risky sexual behaviour, what is less certain is the exact nature of this relationship. The ability of researchers to determine how substance use and sexual risk-taking behaviour are linked has implications for education and treatment efforts. In order to enhance an understanding of this association therefore, experimental and survey-based studies have examined the influence of potential moderators, such as cognitive variables, on this relationship. The differences in the acute pharmacological effects of substances and the motivations that influence their use, may result in different relationships between certain drugs and measures of risky sexual behaviour. The next section of this literature review therefore examines the role of outcome expectancies related to alcohol and other drug use in understanding the link between substance use and risky sex.

3.4 The Role of Outcome Expectancies In Predicting Substance-Related Sexual Risk-Taking

3.4.1 Expectancy Theory: Understanding Drug and Alcohol Use

All risk-taking behaviours involve a consideration of the balance between the anticipated costs and benefits of that behaviour. When an individual chooses to take a psychoactive substance they face the potential of experiencing not only positive but also adverse consequences. It is therefore not surprising that research that attempts to elucidate the processes surrounding an individual's decision to initiate (and where applicable maintain) the use of often harmful substances have remained topical in psychological research. A well recognised way in which to understand an individual's choice to use alcohol or other substances is to examine their motivations for using that substance. Contemporary definitions of motivation in the literature acknowledge the interaction of a range of processes – biological, behavioural and cognitive. In the psychological literature, it is now firmly established that cognitive variables play a critical role in providing insight into aspects of human behaviour related to substance use. These include understanding an individual's motivation to use a drug and also in understanding the drug's influence on the individual's behaviour while they are intoxicated (Fillmore & Vogel-Sprott, 1996; Goldman, Brown, & Christiansen, 1987; Stacy, Newcomb, & Bentler, 1991).

In the drug and alcohol literature, the structured examination of the motivations that drive substance use is now an established way in which the choice of an individual to use a drug has been understood. One way in which this has been achieved is to examine the beliefs about what an individual expects to occur as a result of using a particular substance. The finding that peoples' motivation to drink alcohol is influenced by their expectancies – what they believe will happen to their behaviour, moods and emotions if

alcohol is consumed – formed the basis for outcome expectancy research (Goldman et al., 1987). Although studies have varied in how they have defined the outcome expectancy construct, in general there are some key features that can be observed across the divergent definitions. Firstly, the term outcome expectancy refers to a cognitive variable and this cognitive variable is believed to represent a set of knowledge structures or understandings about the nature of relationships between events or objects in the real world (Goldman et al., 1987). As defined by Goldman et al. (1987, p.183), the nature of this relationship 'is understood to be of an 'if-then' variety; *if* a certain event or object is registered *then* a certain event is expected to follow'. In relation to substance use therefore, outcome expectancies refer to an individual's beliefs about the changes that may occur in a variety of domains, if alcohol or drugs are consumed. For example, in relation to ecstasy use an individual may hold the outcome expectancy 'If I was to use ecstasy, I would become more sociable'. According to expectancy theory, the choice of an individual to use a given substance is primarily accounted for by the individual holding particular expectations regarding the positive and negative effects of using that particular substance.

Research interest in the outcome expectancy construct was initially generated in response to findings of laboratory studies that demonstrated that the acute pharmacological effects of alcohol were not the sole determinant of an individual's behaviour when intoxicated. Marlatt & Rohsenow (1980) for example observed that individuals who were led to believe they had consumed alcohol in a balanced placebo study design behaved in a disinhibited manner. Whilst acknowledging the influence of alcohol's pharmacological properties, outcome expectancy theory attempted to account for such findings by positing that the changes that occur in an individual's behaviour subsequent to alcohol consumption are predominantly determined by the expectancies or beliefs one holds about alcohol's effects (Leigh, 1990). Within this framework more broadly, the behaviour of an individual whilst under the influence of a particular substance can, at least in part, be understood in terms of the outcomes they expect to experience after consuming that substance.

In a foundation study, Brown and colleagues first developed a measure to assess people's expectations concerning the effects of drinking (S. Brown, Goldman, Inn, & Anderson, 1980). Research on the role of cognitive factors on motivations to use alcohol has since evolved significantly and there are now numerous published studies that have documented an association between alcohol outcome expectancies and patterns of alcohol use. This research has firmly established that both positive and negative expectancies contribute to the aetiology and maintenance of different patterns of drinking. Accordingly,

the research emphasises the importance of considering both positive and negative expectancies when examining drinking patterns (Fromme, Stroot, & Kaplan, 1993; Goldman et al., 1987; Lee, Greely, & Oei, 1999; Lewis & O'Neill, 2000; McKee, Hinson, Wall, & Spriel, 1998; Shapiro Cohen & Fromme, 2002; Stacy, Widaman, & Marlatt, 1990; Wall, Hinson, & McKee, 1998). Subsequent research has since firmly established the predictive role of expectancies in consumption patterns of use for other drugs, including cocaine and cannabis (Aarons, Brown, Stice, & Coe, 2001; Galen & Henderson, 1999; Jaffe & Kilbey, 1994; Schafer & Brown, 1991; Stacy et al., 1991; Stacy, Newcomb, & Bentler, 1995) and more recently ecstasy (Engels & ter Bogt, 2004; Scoda, 2002). The research relating to the development of expectancy measures designed specifically to assess the outcome expectancies related to ecstasy use will be reviewed in Chapter Four.

3.4.2 Outcome Expectancies and Sexual Risk-Taking

Based on the benefits that the outcome expectancy framework has demonstrated in understanding substance use, researchers have argued that there are advantages to be gained from applying this conceptual framework to a broader range of risky or disinhibited behaviours that are also related to substance use. Disinhibited behaviours subsequent to drug consumption can encompass a wide range of activities including increased sociability, enhanced expression of emotions, increased aggression and violence, and disinhibited sexual behaviours.

A widely recognised theory that has been used to understand the involvement of people in risky behaviours despite the obvious dangers associated with them is that these activities also have the potential to result in positive or desired outcomes (Cooper, Agocha, & Sheldon, 2000; Fromme, D'Amico, & Katz, 1999; Fromme, Katz, & Rivet, 1997; Leigh, 1990). Researchers have proposed that if positive outcome expectancies related to substance use can reliably predict subsequent substance use, then similarly positive expectancies related to sexual activity may also influence an individual's decision to engage in risky sexual activities (Fromme et al., 1999). In light of the established co-variation that exists between substance use and risky sexual behaviour, researchers have endeavoured to understand this link by examining the outcome expectancies that relate to the effects of a given substance, specifically on the sexual functioning and behaviour of humans. Within the expectancy framework, if sexual enhancement or sexual disinhibition is expected as a consequence of substance use (and these outcomes are wanted), it follows that these expectancies would lead to substance use in a sexual or potentially sexual situation (Fromme et al., 1999; Leigh, 1990). It has been proposed that substance use expectancies

influence substance use in sexual situations through a variety of avenues, such as to decrease inhibitions regarding sex, to enhance sensations or the experience, or to create a suitable mood (Leigh, 1990).

Despite considerable research conducted to examine outcome expectancies relating to substance use, up until a decade ago there was a relative scarcity of research conducted to investigate the impact of outcome expectancies on drug-related risk-taking behaviour. In a preliminary study, Fromme et al. (1997) demonstrated that outcome expectancies regarding potential positive consequences were positively and reliably associated with participation in a range of risky activities in addition to substance use. Since this study there is now a body of research that suggests that outcome expectancies may also play a role in sexually disinhibited behaviours specifically related to substance use (Corbin & Fromme, 2002; Dermen & Cooper, 1994b, 2000; Dermen, Cooper, & Agocha, 1998; Fromme et al., 1999; Gordon, Carey, & Carey, 1997; Hendershot, Stoner, George, & Norris, 2007; Kalichman & Cain, 2004; Kalichman, Tannenbaum, & Nachimson, 1998; Leigh, 1990).

A number of laboratory studies have provided evidence for the direct effect of pharmacological mechanisms in understanding the relationship between alcohol and the theoretical determinants of sexual risk-taking behaviour (for a review see George & Stoner, 2000). In laboratory studies that have employed a placebo design however, the direct influence of alcohol has been shown to also be influenced by expectancies regarding the effects of alcohol on various aspects of sexual behaviour (Fromme et al., 1999; Gordon et al., 1997). For example, in a controlled experimental setting, Gordon et al. (1997) examined the effects of alcohol use on two outcome measures: attitudes towards condoms; and, HIV-related behavioural skills, such as the negotiation of condom use. Employing a sample of sexually active men who identified as current drinkers, participants were assigned to either placebo, sober or alcohol conditions. After participating in a drinking event, the participants then completed a measure of attitudes towards condom use and, as a measure of their behavioural skills, participated in a role-play of sexual communication. Consistent with prior research Gordon et al. (1997) observed that the pharmacological effects of alcohol resulted in a reduced performance in behavioural skills – more specifically men in the alcohol condition demonstrated lower behavioural skill to negotiate condom use than men in the sober condition and were also more likely to consent to sex without a condom. In addition, however, sex-related alcohol expectancies were also shown to influence safer sex outcomes, with those men who more strongly endorsed expectancies that alcohol alters one's sexual behaviour demonstrating significantly less ability to negotiate a safe sex

outcome in the sexual risk role play scenarios. Although regression analyses revealed that outcome expectancies did not account for variance in behavioural skills after beverage content was considered, sex-related alcohol expectancies did emerge as a significant predictor of condom attitudes after controlling for the effects of previous drinking patterns. In summary, those participants who reported higher subjective intoxication and held stronger sex-related expectancies reported more negative attitudes towards the use of condoms.

In later research Fromme and colleagues (1999) conducted two studies in which both cognitive impairment and outcome expectancy theories were tested in examining the relationship between alcohol use and risky sexual practices. Employing samples of college students who were administered either alcohol, placebo, or water, participants were asked in the first study to rate the likelihood that potential consequences (both positive and negative) would result from four 'risky' sexual activities and then to indicate their expected involvement in these activities. Using the same design in a second study, participants were asked to list the potential consequences that could result from sex without a condom after watching a videotaped scenario that related to a sexual situation. Similar to the findings of Gordon et al. (1997), support for both the cognitive impairment and expectancy models was observed. In support of the cognitive impairment model, intoxicated participants reported lower perception of risk and fewer negative consequences associated with unsafe sexual practices than did those who received placebo or water. These findings – that alcohol use selectively reduced both the quality and number of negative consequences that were generated when people were asked to consider the consequences associated with sexual activity – are therefore also supportive of alcohol 'myopia' theory (Steele & Josephs, 1990).

In support of expectancy theory, outcome expectancies were found to influence both post-drinking perceptions of risk and behavioural intention to engage in risky acts, regardless of whether alcohol had been consumed or not (Fromme et al., 1999). Those participants who expected alcohol to disinhibit their sexual behaviour, compared to those who did not expect disinhibition, reported a pattern of responses that focussed on strong perceptions of benefit for risky sexual practices and also that those potential benefits would more strongly influence their decision to engage in unsafe sex. 'High' expectancy individuals also reported that they were more likely to engage in risky sexual practices, again regardless of their beverage condition. When considered collectively, these results suggest that while the use of alcohol decreases an individual's ability to evaluate personal risk,

positive outcome expectancies provide individuals with the motivation to engage in risky sex (Fromme et al., 1999). The findings of Fromme et al. (1999) indicate that when combined with objective cognitive impairment, strong positive expectancies regarding the effects of alcohol on sexual behaviour are likely to contribute to sexual risk-taking behaviour under the influence of alcohol.

In the survey literature that examines the mechanisms through which alcohol may exert its effects on sexual responding, there are now a number of studies published supporting a specific association between the role of sex-related outcome expectancies and alcohol related risky sexual practices. Although most studies have demonstrated a positive association between sex-related outcome expectancies and risky sexual behaviour (Corbin & Fromme, 2002; Dermen & Cooper, 1994b, 2000; Dermen et al., 1998; Hendershot et al., 2007; Kalichman & Cain, 2004; Kalichman et al., 1998; Leigh, 1990; McKirnan et al., 2001), some studies (Katz, Fromme, & D'Amico, 2000; Shapiro Cohen & Fromme, 2002) have failed to demonstrate this relationship. For example, Katz et al. (2000) conducted a longitudinal study that examined the relationship between outcome expectancies, personality and three forms of risk-taking behaviour (heavy drinking, drug use and unsafe sex) among undergraduate university students. Hierarchical regression analyses were employed to test the hypothesis that outcome expectancies are associated with subsequent risk-taking in these domains, when previous risk-taking is statistically controlled for. Although outcome expectancies were found to account for a significant proportion of variance in general risk-taking behaviours related to substance use (beyond that explained by prior substance use), in this instance outcome expectancies did not predict risky sexual behaviour in particular. In addition, Shapiro Cohen & Fromme (2002) found that self-efficacy expectancies, not outcome expectancies, were strongly related to sexual risk-taking in a sample of young adults.

One of the earliest studies in this area, however, did demonstrate a relationship between the beliefs about the effect of alcohol on sexual behaviour to the use of alcohol in sexual situations (Leigh, 1990). This research was conducted as part of a larger study that examined alcohol use and sexual behaviour more broadly among a large sample ($N = 844$) of predominantly white, heterosexual, well-educated, male and female adults ranging in age from 18 to 76 years of age. A primary goal of this research was to examine the influence that sex-related alcohol outcome expectancies had on the number of sexual encounters that included drinking as well as the amount drunk in sexual encounters in the past 30 days (Leigh, 1990). In addition, beliefs relating to the effects of alcohol on sexual behaviour

were also investigated in relation to the sexual behaviours (e.g. risk-taking) and feelings (e.g. decreased nervousness) resulting from those situations. Outcome expectancies were assessed by the inclusion of 13 statements that related to possible effects of drinking alcohol on sexual behaviour. Each of these items was then followed by a scale asking 'Does alcohol have this effect on you?', to which participants responded on a four point Likert scale that ranged from 'Not at all' to 'Very much'.

In support of prior predictions, Leigh (1990) found that positive or enhancement expectancies relating to the effects of alcohol on sexual behaviour clearly demonstrated an influence on the use of alcohol in sexual situations. In particular, outcome expectancies regarding the effects of alcohol on sex predicted drinking in sexual situations, both on the level of single events (in terms of amount of alcohol consumed) and on the overall frequency of sexual encounters in the past month. Those individuals who more strongly endorsed alcohol expectancies regarding the ability of alcohol to reduce nervousness about sex or enhance sexual experience were not only more likely to drink in conjunction with sexual encounters, but they were also more likely to drink heavily in those situations. It is important to note however that no difference was observed in the level of involvement in 'risky' sexual activity specifically (defined as unprotected sex with someone other than a steady partner) according to the strength of their expectancies. The failure to establish an association between expectancies and this measure of sexual risk-taking may be attributable to the fact that Leigh (1990) did not assess expectancies that related to disinhibition in particular.

In an interesting set of findings, Leigh (1990) also reported that the strength of the relationship between sex-related expectancies and the use of alcohol in sexual contexts was found to vary according to the individual's pre-existing sexual attitudes – that is, the influence of outcome expectancies on alcohol use were most strongly witnessed among those individuals who held negative sexual attitudes or were anxious about sex. Leigh's preliminary findings (1990) therefore provided support for the notion that expectancies may motivate drinking more powerfully in those individuals who are in need of an excuse for sexual disinhibition.

Following the seminal research of Leigh (1990), Dermen and colleagues (Dermen & Cooper, 1994b, 2000; Dermen et al., 1998) also investigated the relationship between alcohol use, sex-related expectancies and sexual behaviour in a series of studies using adolescent and young adult samples. In the first of three studies, Dermen et al. (1994b)

explored whether outcome expectancies served as reliable predictors of whether individuals used alcohol in particular social situations (attending a party, going on a date, having sexual intercourse). Similar to Leigh's research, they also examined the frequency of heavy drinking in particular, among those adolescents who used alcohol in certain situations. Dermen et al. (1994b) obtained a representative sample of sexually experienced adolescents (aged 13 to 19 years) who had ever used alcohol. Improving upon Leigh's (1990) research, a three factor measure was utilised in order to assess sex-related alcohol expectancies. The three domains specifically addressed in this expectancy measure were: enhancement of sexual experiences (e.g. 'After a few drinks of alcohol I am a better lover'); increased sexual risk-taking (e.g. 'After a few drinks of alcohol I am less likely to take precautions before having sex') and disinhibition of sexual behaviour (e.g. 'After a few drinks of alcohol I am more likely to do sexual things that I wouldn't do when sober') (Dermen & Cooper, 1994a). Dermen et al. (1994b) also included a measure of general alcohol expectancies, in order to compare general versus sex-specific outcome expectancies with regard to their ability to predict this behaviour. Consistent with prior predictions, the results in general indicated that sex-related alcohol outcome expectancies predicted the use of alcohol use in all three situations. Sex-specific outcome expectancies demonstrated the strongest ability in predicting alcohol use prior to or during sexual intercourse and, additionally, were shown to be statistically superior to general alcohol expectancies in predicting alcohol use in the three sexual situations. The pattern of these findings is generally consistent with the notion that individuals who expect a range of positive benefits are more likely to drink, while those who expect alcohol to put them at increased risk in some way are, on the whole, likely to avoid the use of alcohol in these situations.

When predicting the frequency of heavy drinking in these situations however, a more interesting pattern emerged. Those adolescents who held strong disinhibition expectancies in particular drank to excess both at parties and also during sexual intercourse, whereas those adolescents who more strongly endorsed enhancement expectancies were more likely to drink to intoxication on dates. In a subsequent study, Dermen et al. (1998) tested the hypothesis that sex-related alcohol expectancies would moderate the relationship between alcohol use and a composite measure of sexual risk-taking. Again the results of this research were based on the responses of a representative sample of adolescents. In further support of the notion that sex-specific alcohol expectancies play a part in understanding alcohol related sexual risk-taking, Dermen et al. (1998) reported that the belief (outcome expectancies) that alcohol increases sexual risk-taking moderated the relationship between alcohol use and a risky sexual behaviour on two specific sexual

episodes that were investigated. In particular, among individuals who more strongly believed that alcohol use would result in sexual risk-taking, the use of alcohol was more strongly related to sexual risk-taking on the first and last occasions that participants had sex.

Additional studies have also provided further support for the role of outcome expectancies in understanding the link between the alcohol and risky sex association using slightly older samples. Based on the patterns of findings observed in a number of these studies, some researchers have argued that alcohol use and sex-related outcome expectancies may play a prominent role particularly in the early stages of a sexual relationship. Dermen and Cooper (2000), for example, demonstrated that in general, the use of alcohol resulted in decreased rates of condom use for individuals with stronger positive outcome expectancies regarding the effects of alcohol on sexual behaviour. When this relationship was examined in regard to discrete sexual events, outcome expectancies were found to moderate the effect of alcohol on condom use for young adults on their first sexual experience and also on the first time they had sex with their most recent partner. Dermen & Cooper's (2000) findings were consistent with those of Corbin & Fromme (2002) who reported that the interaction between alcohol use, positive outcome expectancies and reduced likelihood of condom use was observed among individuals reporting on the first sexual event in an ongoing relationship and those reporting on the first sexual event with a new partner. At the event level of analysis, these results were consistent with the theory that alcohol use leads to a reduced likelihood of condom use for individuals with strong positive outcome expectancies regarding the effects of alcohol on sexual behaviour at least in initial sexual encounters.

Similar patterns of associations as those demonstrated between sex-related alcohol expectancies and alcohol-related risky sex have also been observed for sex-related expectancies that relate to some illicit drugs (such as marijuana, cocaine and amyl nitrate) and associated sexual risk-taking. McKirnan et al. (2001) examined this issue among a group of gay and bisexual men who attended a behavioural intervention for safer sex results. Firstly, the authors confirmed the hypothesis that general rates of sexual risk-taking would change according to variations in patterns of substance use. Compared to men who only used alcohol in combination with sex or who infrequently combined drugs with sex, men that reported frequently combining drugs with sex reported significantly higher rates of sexual risk-taking. The motivation to use substances as a means of 'cognitive escape', by decreasing awareness and hence anxiety regarding their level of HIV risk, was the critical

moderator variable through which McKirnan et al. (2001) proposed substance use would exert its influence on sexual risk-taking for this sample, the members of which were at increased risk for contracting HIV. McKirnan et al. (2001) predicted that men who combined drugs with sex would be most sexually risky if they held strong expectancies that substance use would enhance their sexual experience and allow them to escape pressures of ensuring sexual safety. The central finding of this study was that a set of cognitions reflecting that substance use could both enhance sexual encounters and provide 'cognitive escape' moderated the influence of drug use patterns on sexual risk. Importantly, these findings demonstrated that in addition to any specific drug effect, psychological processes influence risky behaviour for a specific subgroup of gay and bisexual men at elevated risk.

3.4.3 Summary

The research reviewed in this section points to a number of findings. Firstly, the outcome expectancy framework has demonstrated strong utility in ascertaining why individuals choose to use substances, and also in predicting subsequent patterns of substance use. Based on this literature, expectancy theorists have proposed that, in addition to understanding substance use itself, the outcome expectancy framework could also be applied to understanding risky or disinhibited sexual behaviours that occur under the influence of substances. The research to date provides sound support for the assertion that sexual behaviour in the context of alcohol use is, in part, influenced and motivated by pre-existing beliefs about the effects of alcohol on sexual behaviour and functioning and in particular by expectancies that relate to positive or enhanced sexual experiences. Research has since emerged that examines the outcome expectancies associated with the effects of other psychoactive drugs on sexual functioning and whilst initial findings are promising, more research is needed before any definitive conclusions can be drawn. Therefore, whilst acknowledging the importance of the direct disinhibiting properties of substances in understanding substance-related sexual risk-taking, the literature also highlights that valuable information can be lost by assuming a direct effect of substance use on sexual risk-taking in isolation. Collectively these findings suggest that substance use may have an effect primarily on those individuals who hold a specific set of beliefs regarding the effects of psychoactive substances on sexual behaviour and also point to indications that this may be the case in particular for individuals with specific anxieties towards sex.

CHAPTER FOUR

Outcome Expectancies, Ecstasy Use and Sexual Risk-Taking

4.1 General Introduction

Based on the literature reviewed in Chapter One, it is evident that research attempting to identify the complex factors that underlie risky sexual behaviour has the potential to offer significant benefit. Chapter Two emphasises that ecstasy, a drug that has achieved worldwide popularity, is associated with a range of negative physical and psychological side effects. An emerging issue associated with the use of ecstasy more recently has been the identified association between this drug and increased involvement by its users in risky sexual behaviours. This chapter also presents the now substantial body of evidence suggesting that, as for alcohol, individuals are more likely to engage in sexual risk-taking after ecstasy use. What becomes clear from the literature review in Chapter Three is that when researching the relationship between substance and risky sexual behaviour the role of variables other than the biological effects of the drug itself, such as one's beliefs about the effects of the drug, should be considered. Chapter Three highlights that in the alcohol literature, there is research that demonstrates that beliefs people hold about the effects of alcohol on sexual functioning and behaviour – that is, their outcome expectancies – have been shown to influence their sexual behaviour whilst under the influence of alcohol. This framework has not yet been explored in relation to ecstasy related sexual risk-taking. With these findings in mind, it is clear that an examination of ecstasy outcome expectancies may contribute to enhancing our understanding of the relationship between ecstasy use and ecstasy-related sexual risk-taking behaviour.

4.2 Ecstasy Outcome Expectancies

Despite ecstasy attracting increasing attention in recent years, only two known empirical studies have attempted to systematically examine the outcome expectancies associated with the drug's use (Engels & ter Bogt, 2004; Scoda, 2002). The first of these studies was conducted in Australia, with the overarching aim of the project to develop a psychometrically sound measure to assess outcome expectancies specifically associated with ecstasy use (Scoda, 2002). The sample utilised in the first of two studies conducted by Scoda (2002) was comprised of 327 participants, with 147 (45%) individuals who reported ever having used ecstasy (most of whom had used ecstasy in the past year) and 180 (55%)

respondents who had never used ecstasy in their lifetime. Approximately two-thirds (67%) of the sample were female and the age of participants ranged from 17 to 52, with the majority of the sample aged in their mid 20s. These participants responded to an initial pool of questions that were generated from two primary sources: individual interviews with ecstasy users who reported varying experience with the drug, and a review of the outcome expectancies reported in the alcohol, cannabis, stimulant and the broader ecstasy literature. For each of 137 items that formed the provisional questionnaire, participants were asked to indicate what they believe happens to them or other people when they take ecstasy. The response format for each statement was a Likert scale, with zero indicating 'Strongly Disagree' and seven indicating 'Strongly Agree'. The resultant Ecstasy Expectancy Questionnaire (EEQ) was finalised at 33 items which were found to be reducible to eight factors using principle axis factor analysis (Scoda, 2002). As has been documented for outcome expectancies relating to alcohol, cocaine and marijuana consumption (Fromme et al., 1993; Jaffe & Kilbey, 1994; Schafer & Brown, 1991), the outcome expectancies relating to effects of ecstasy use were found to exist along both positive and negative dimensions. Specifically, three of the eight factors related to positive outcomes associated with ecstasy use. These factors reflected beliefs that: ecstasy use is associated with increased sociability and being empathic (Sociability Subscale); ecstasy use will increase coping ability (Increased Coping Subscale); and that ecstasy reduces tension (Tension Reduction Subscale). Conversely, three factors of the EEQ were found to be related to negative outcomes associated with ecstasy use, namely that: using ecstasy is associated with a decline in cognitive performance (Cognitive Decrement Subscale); ecstasy use is associated with impaired sexual performance (Sexual Decrement Subscale); and using ecstasy induces negative mood states (Negative Mood State Subscale). The remaining scales reflected beliefs that using ecstasy is associated with increased risk-taking and altered perception (Manic Mood State Subscale) and that ecstasy use is associated with trying new sexual experiences (Sexual Enhancement Subscale). Scoda (2002) suggested that the latter two scales were not inherently positive or negative, and reflected the ambivalence with which these effects (of ecstasy) are experienced by individuals.

Scoda (2002) then also examined the EEQ subscales in terms of their predictive utility in relation to individuals who had ever used the drug. The preliminary analyses conducted by Scoda (2002) indicated that there were statistical differences between ecstasy users and non-users in terms of their expectancies regarding ecstasy, with users more likely to hold positive expectancies (specifically that using ecstasy will make them more social and empathic towards others) and non-users more likely to hold negative expectancies

regarding the effects of this drug (specifically that ecstasy use is associated with increase in negative affect and decreases in sexual and cognitive performance). That the use of ecstasy tends to be associated with more positive outcome expectancies and non-use is associated with negative outcome expectancies is a finding consistent with the pattern documented in earlier studies establishing a difference in the outcome expectancies held for cocaine and marijuana users and non-users (Aarons et al., 2001; Galen & Henderson, 1999; Jaffe & Kilbey, 1994; Schafer & Brown, 1991). However, when logistic regression analyses were conducted to examine specifically which expectancies were predictive of ecstasy use, five of the eight EEQ subscales including both positive and negative outcome expectancies (Sociability, Cognitive Decrement, Manic Mood State, Increased Coping and Sexual Decrement) were found to be statistically significant predictors of ecstasy use. Furthermore, Scoda (2002) demonstrated that the beliefs about ecstasy were able to predict ecstasy use after adjustment for the impact of demographic variables including income, employment status and religious background. In a subsequent study Scoda (2002) sought to determine whether, as is the case for other substances, stable personality characteristics or traits influenced ecstasy use and also ecstasy expectancies. Attesting to the strength of the expectancy findings already observed, the EEQ subscales were again demonstrated to predict ecstasy use, this time after statistically adjusting for sensation-seeking and a comprehensive personality measure (Scoda, 2002).

In a second cross-sectional study exploring the types of ecstasy outcome expectancies that both current users and non-users of the drug endorsed, Engels & ter Bogt (2004) employed a sample of visitors to 'rave' parties in the Netherlands. Recruited across seven separate raves, the sample ($N = 844$) in this study was comprised of a majority of males (67%) aged between 14 and 43 years of age who had generally attained high levels of education, and most (65%) of whom identified as current ecstasy users. Like Scoda's (2002) earlier research, Engels & ter Bogt (2004) aimed to assess the differences between ecstasy users and non-users in terms of their beliefs about the effects of this substance. Additionally, among those participants who identified as users of the drug, the authors attempted to examine whether differences were observed according to both the quantity (measured by the number of pills taken on each occasion of use) and frequency of ecstasy use (assessed by the length of time they had been using ecstasy on a scale ranging from less than six months to two years or more). The items in the initial 45-item expectancy measure constructed by Engels & ter Bogt (2004) were selected based on an examination of both alcohol outcome expectancies and previous studies that explored the expected effects and motivations for ecstasy use. Each of the items related to the possible effects of ecstasy use

– when responding, participants were asked to indicate whether they had experienced each of those effects, or in the case that they had never used ecstasy, which effects they would expect to experience. The results of a subsequent factor analysis revealed seven factors that were able to discriminate between current ecstasy users and non-users. The first factor captured 11 of the adverse consequences associated with ecstasy use and was named 'Negative Effects'. The remaining six factors were all considered to relate to positive outcome expectancies, specifically that ecstasy: enhances one's mood (Enhancement); increases energy and a sense of euphoria (Euphoria); relates to positive sexual consequences (Sexiness); provides the opportunity to dance for extended periods (Dancing); improves the quality and intensity of relationships with others (Communication); and heightens intimacy and openness with others (Openness).

When differentiating between users or non-users on the basis of these expectancies, non-ecstasy users in general endorsed stronger negative outcome expectancies (measured by the global Negative Effects subscale), whereas users were more likely to endorse positive outcome expectancies, specifically those relating to the enhancement of mood, self-insight and euphoria. This set of results were consistent with patterns of findings relating to expectancies for other drugs (Aarons et al., 2001; Galen & Henderson, 1999; Schafer & Brown, 1991) and also Scoda's (2002) study, wherein users of a substance tend to hold stronger positive expectancies regarding its effects and non-users hold stronger negative outcome expectancies. No differences however were found on expectancies regarding sexual benefits of ecstasy use (Sexiness Subscale), or the opportunities ecstasy provides to dance (Dancing Subscale) and enhance communication (Communication Subscale) between users and non-users of ecstasy. In contrast to these results, Scoda (2002) found that both male and female users more strongly endorsed items that reflected the belief that ecstasy use is associated with being more empathic and social, than did non-using males and females. In a later analysis, the seven ecstasy expectancy scales were entered into a logistic regression equation to assess whether these expectancies were able to predict ecstasy use – this was after statistically controlling for effects of gender, age and education level. Consistent with Scoda's (2002) findings, the outcome expectancies that were found to be predictive of current ecstasy use in this sample were again found to lie on both positive and negative dimensions, with higher scores on enhanced communication and self-insight, and lower scores on the negative expectancy scale predictive of ecstasy use.

It is important to note that there were a number of methodological issues relating to Engels & ter Bogt's (2004) study. As identified by the authors, the first of these

limitations was the classification of participants as ecstasy users or non-users, based only on whether respondents identified as current (i.e. at the time of interview) users or non-users of the drug. The possibility that the 'non-using' proportion of the sample consisted of individuals who had negative experiences with ecstasy in the past and ceased use, and in turn, were more likely to endorse negative expectancies, could therefore not be discounted (Engels & ter Bogt, 2004). Furthermore, the construction of the ecstasy expectancy measure in this study was primarily based on the work regarding alcohol outcome expectancies and previous research involving interviews with current ecstasy users regarding the drug's effects. In Scoda's (2002) study, the inclusion of items in the preliminary EEQ was based not only on relevant reported effects in the alcohol literature and effects reported by ecstasy users, but also importantly covered effects reported in the marijuana and stimulant literature and included consultations with ecstasy experts. Additionally, Engels & ter Bogt (2004) utilised a dichotomous response format which has been identified as a methodological shortcoming in the development of earlier cocaine and marijuana expectancy scales in Schafer & Brown's (1991) research. Other researchers (Jaffe & Kilbey, 1994) have previously argued that the use of a Likert scale such as that adopted in the Scoda (2002) study is not only more suitable for factor analysis (statistical) methods typically used in this area of research, but also that the Likert scale method enables a more detailed analysis of any possible differences that may exist between groups of abusers, experimental users and non-users of a particular substance by quantifying the strength of a given expectancy about that drug. Additionally, the EEQ (Scoda, 2002) provided greater specificity regarding the potential negative expectancies people hold regarding ecstasy effects (such as the psychological, physiological, and behavioural consequences) whereas in the measure constructed by Engels & ter Bogt (2004), 'negative effects' were subsumed under one broad factor. The reliability of the data obtained in Engels & ter Bogt's (2004) research could also be questioned given that participants completed the survey in the context of a rave party, and hence could have been under the influence of alcohol or other drugs at the time.

Interestingly, neither of the studies that have examined ecstasy outcome expectancies to date have been able to differentiate between ecstasy users according to the frequency of their use (Engels & ter Bogt, 2004; Scoda, 2002). However, when examining the differences in ecstasy outcome expectancies with regard to 'frequency' of use, Scoda (2002) and Engels & ter Bogt (2004) varied in their definitions of 'frequency'. Firstly, Scoda (2002) assigned participants to one of two categories – 'light' or 'heavy' user – based on the frequency of their ecstasy use in the previous 12 months. 'Light' users were defined

as individuals who had used ecstasy on a less than fortnightly basis in the previous year, whereas 'heavy' users had taken ecstasy on a fortnightly or greater than fortnightly basis in that period of time. Provided these classifications, ecstasy outcome expectancies were not shown to discriminate between ecstasy users according to the frequency of their ecstasy use. In contrast, Engels & ter Bogt (2004) examined potential differences in ecstasy outcome expectancies according to frequency of ecstasy use by defining frequency with respect to the length of time over which participants had been taking ecstasy in their lifetime. The frequency of use in this study was measured on a four point scale ranging from one ('Less than six months') to four ('Two years or longer'). No relationships were found between ecstasy outcome expectancies and frequency of ecstasy use when measured in this way. The results of Scoda (2002) and Engels & ter Bogt (2004) therefore run contrary to studies examining alcohol and cocaine outcome expectancies that differentiate between substance users according to the frequency of their drug use based on the outcome expectancies they hold (Galen & Henderson, 1999; Jaffe & Kilbey, 1994; Lewis & O'Neill, 2000). To date, ecstasy outcome expectancies have not been examined among a sample of regular or established users of this substance.

4.3 Aims of the Current Study

Based on the literature discussed thus far, there were two primary aims of this study. The first was to examine whether ecstasy outcome expectancies predict sexual risk-taking or disinhibited sexual behaviour, over and above level of ecstasy use and demographic variables of importance such as gender, sexual orientation and age (Strote et al., 2002; Topp, Hando, & Dillon, 1999). Consistent with the finding that in the case of alcohol, sexual risk-taking is in part activated by individually held beliefs about alcohol's effects (Dermen & Cooper, 1994b, 2000; Dermen et al., 1998; Fromme et al., 1999; Gordon et al., 1997; Leigh, 1990), it was predicted that those participants who believed ecstasy had a disinhibitory effect on one's sexual behaviour would be more likely to engage in sexual risk-taking under the influence of ecstasy. Specifically, it was predicted that participants who believed that ecstasy was associated with increased risk-taking and trying new sexual experiences (as measured by the Manic Mood State and Sexual Enhancement EEQ subscales respectively) were more likely to report ecstasy related sexual risk-taking. The measures of sexual risk-taking central to this study were whether participants reported having engaged in sex under the influence of ecstasy in the preceding six months, and also more specifically, whether they had engaged in unsafe or unintended sex under the influence of ecstasy. To test the hypothesis that ecstasy outcome expectancies were

predictors of sexual disinhibition and risk-taking over and above cognitive impairment, the level of ecstasy use was included as a concurrent predictor, based on the assumption that the more ecstasy is regularly ingested, the more impaired or disinhibited the individual will be. In much of the previous research that has examined the relationship between substance use and sexual risk-taking, the relationship between the use of particular substances and sex risk is only associational. In the current study however, the measure of sexual risk-taking directly assessed whether risky sexual practices occurred while respondents were under the influence of ecstasy. This study therefore expands on previous research by examining whether the use of ecstasy and risky sexual behaviour co-occurred within specific episodes. Additionally, in the majority of research examining the association between ecstasy use and risky sexual behaviour so far this issue has been primarily explored in samples of gay and bisexual men who are traditionally considered as 'high-risk' for exposure to HIV and other STIs (Choi et al., 2005; Klitzman et al., 2002; Klitzman et al., 2000; Mattison et al., 2001; McKirnan et al., 2001; Waldo et al., 2000). The current study examines the association between ecstasy use and risky sexual practices in a predominantly heterosexual group of young adults recruited on the basis of their recent ecstasy use.

Following Scoda (2002) and Engels & Ter Bogt's (2004) research, a second aim of this study was to examine a sample of regular ecstasy users and to determine whether there is a difference in beliefs about ecstasy (as measured by the EEQ) related to different patterns of ecstasy use. The assignment of participants to 'light' and 'heavy' user groups was determined on the frequency of their ecstasy use in the preceding six months. Based on former studies (Parrott et al., 2000; Scoda, 2002) 'light' users were defined as those having used ecstasy on a less than fortnightly basis (i.e. less than 12 times in the past six months), whereas 'heavy' users was defined as having used fortnightly or more than fortnightly in the preceding six months (i.e. 12 or more times in the past six months).

4.4 Method

4.4.1 Participants

A total of 220 individuals volunteered to participate in the study, comprising 116 (53%) participants from Canberra and 104 (47%) participants from Sydney. The sample was predominantly male (65%). The age of participants ranged from 17 to 60, with a mean age of 25 years (SD = 7.21). All participants had used ecstasy at least monthly (i.e. six times) in the previous six months.

4.4.2 Procedure

The sample in the present study consisted of regular ecstasy users who were interviewed in Canberra and Sydney, Australia, between April and July 2004 as part of the 2004 Australian EDRS project. The aims of the EDRS project are provided earlier in this dissertation (Chapter Two). The study involves the annual collection and triangulation of data from three sources: face to face interviews with regular ecstasy users recruited in each Australian capital city; interviews with key experts who have professional contact with ecstasy users and knowledge of the ecstasy and related drugs scene in their city; and finally 'indicator' or routinely collected data sources such as drug seizure, arrest and hospital admission data.

Regular ecstasy users recruited as participants for the 2004 EDRS in New South Wales (NSW) and the Australian Capital Territory (ACT) were administered additional questionnaires for the purposes of the current study. Despite the fact ecstasy is widely used across the Australian population, consumers of this drug comprise a 'hidden' population due to the illicit status of the drug and so the size and composition of the ecstasy using population is therefore unknown (Biernacki & Waldorf, 1981). Participants were recruited for the study using a purposive sampling strategy (Kerlinger, 1986) which initially involved placing advertisements for the study in street press and university publications, music and clothing stores and advertisements posted on tertiary education campus notice boards. The 'snowball' sampling technique is commonly used when researching groups such as ecstasy users that are hard to reach, and therefore was also utilised for the purpose of this study. Once individuals had completed the questionnaire, they were then asked if they would be willing to discuss the study with friends who would be interested in participating. Those participants who agreed were given a bundle of flyers that listed the contact details for the study.

Individuals who were interested in participating in the study contacted the researchers by telephone or email. Entry criteria were: the use of ecstasy on at least six occasions in the preceding six months (i.e. at least monthly use in the past six months); to have been a resident of the capital city in which the interview took place for the past 12 months (i.e. Sydney or Canberra); and to be at least 16 years of age to participate in Sydney and 18 years of age to participate in Canberra. These age differences were a result of the divergent requirements of two human research ethics committees in Sydney and Canberra. The study was approved by the appropriate human research ethics committees at the Australian National University (ANU) and the University of New South Wales (UNSW).

The interviews were conducted by interviewers trained in administration of the interview schedule. Interviews took place in locations such as cafes, university campuses, bars, and parks. Before commencing the interview, participants were required to read a study information form. The nature and purpose of the study was also explained by the interviewer prior to obtaining the informed consent of the participant. On completion of the interview participants were provided with AUD $30 as reimbursement for their time and travel expenses.

Because the data reported in the current study was conducted as an extension of the EDRS, the statement below has been provided to clarify the candidate's involvement in designing the extension study, and also in the collection of the data. During the time of the studies reported in this and the next chapter (Chapter Five), the candidate was employed as the senior research officer for the EDRS and its' parent study – the Illicit Drug Reporting System (IDRS) – for the ACT. Responsibilities included managing and co-ordinating the implementation of the ACT arms of the EDRS and IDRS projects. The studies reported in this chapter and the subsequent chapter were conceived and designed as extensions of the EDRS by the candidate. The candidate was actively involved in the data collection process and conducted the statistical analysis of the data for the studies reported in this and the next chapter. The third study reported in Chapter Six, was conceived and carried out by the candidate independent of the EDRS project for that year.

4.4.3 Measures

Participants were administered a structured interview based on a national study of ecstasy use conducted by NDARC in 1997 and subsequent studies conducted in NSW, Queensland (QLD) and South Australia (SA). The full results of the 2004 ACT and NSW EDRS studies are reported elsewhere (Degenhardt, Agaliotis, White, & Stafford, 2005; Proudfoot, Ward, Buckingham, & Sparks, 2005) and the variables of interest for this study are described below.

Data were collected on demographic information and patterns of ecstasy and other drug use, with a focus on patterns of use in the six months prior to interview. For each drug (listed below) participants were asked whether they had ever used the drug, whether they had used the drug in the past six months, how often they had used the drug in the past six months, how they had administered the drug (swallowing, snorting, smoking, injecting) in their lifetime and also specifically in the past six months, and what amount had they used of the drugs in a 'typical' and the 'heaviest' episodes of use: alcohol; cannabis; tobacco;

methamphetamine (powder, base and crystal forms asked about separately); cocaine; LSD; MDA; ketamine; GHB; amyl nitrate; nitrous oxide; benzodiazepines; anti-depressants; heroin; methadone; other opiates. In addition to the above questions participants were also asked in relation to their ecstasy use about: the age at which they first tried ecstasy; the age at which they started to use ecstasy regularly (i.e. on a monthly basis); their preferred route of ecstasy administration in the past six months (swallowing, snorting, injecting, smoking, shelving/shafting); whether they used drugs in combination with ecstasy (and if so, which drugs); and whether they used other drugs to facilitate their 'comedown' (also nominating which drugs were used with ecstasy in this context).

A series of questions relating to sexual risk behaviour in the past six months were also administered to participants as part of the EDRS schedule. Participants were asked: how many sexual partners they had in the past six months; the frequency of condom use for sex with 'regular' and 'casual' partners in the past six months; frequency of anal sex in the past six months; whether they had had sex under the influence of ecstasy and other drugs in the past six months (and if so, to estimate how often); which drugs they had had sex under the influence of the last time they identified as doing so; and the frequency of condom use for sex under the influence of substance with 'regular' and 'casual' partners.

On completion of the structured interview, outcome expectancies relating to ecstasy use were assessed using the 33-item EEQ (Scoda, 2002; see Appendix A.1). The EEQ is a self-report scale that measures both positive and negative beliefs about the effects of ecstasy. The EEQ asks participants to indicate what they believe happens to them or other people when they take ecstasy. The extent of the respondents' agreement with each of the 33 items is measured on a Likert scale where zero indicates 'Strongly Disagree' and 7 indicates 'Strongly Agree'. The eight subscales comprising the EEQ are: Sociability; Increased Coping; Cognitive Decrement; Sexual Decrement; Negative Mood State; Manic Mood State; Sexual Enhancement; and Tension Reduction (Scoda, 2002). In the study in which the EEQ was developed, the eight composite scales demonstrated good internal consistency as measured by coefficient alpha (α) with a full scale reliability of .82, and the subsequent reliability analysis of each of the individual subscales were also shown to be adequate for research purposes. In a subsequent study, the sound psychometric properties of the EEQ were further established through replication of internal consistency and the demonstration of convergent and discriminant validity (Scoda, 2002).

In addition to the EEQ, participants in the ACT were also asked directly whether in the past six months they had had unsafe or unintended sex under the influence of ecstasy or other party drugs. These questions are included in Appendix A.2.

4.4.4 Data Analysis

Correlational analyses employed Pearson's correlation coefficient and Spearman's correlation coefficient where the assumptions for parametric tests were not met. For dichotomous variables, the Pearson's Chi-square (χ^2) test was used to assess for statistical differences between groups. T-tests were employed to compare differences between groups on continuous variables, except where the variables were highly skewed, where medians were reported and the Mann-Whitney *U* test employed. Binary variables were created to indicate whether each respondent in the past six months had or had not engaged in: sex under the influence of ecstasy (the last time they had sex under the influence of party drugs); unsafe sex under the influence of ecstasy; or unintended sex under the influence of ecstasy. Multiple logistic regression analysis was employed to then examine the relationship between the dichotomous sexual risk-taking variables and explanatory variables which included demographic variables of importance, frequency of recent (past six months) ecstasy use, and ecstasy outcome expectancies as measured by the EEQ (Scoda, 2002). Backwards elimination of variables was used to select the most parsimonious regression models following the procedure recommended by Kleinbaum, Kupper & Muller (1988). All analyses were conducted using SPSS for Windows. A two-tailed alpha criterion of 0.05 was employed for all statistical tests.

4.5 Results

The results of this study will be presented in three sections. The first section describes the demographic characteristics and patterns of ecstasy and other drug use for the sample. In the second section, the response of participants to the EEQ is examined first in respect to differences according to demographic variables. A series of t-tests which were conducted to assess whether ecstasy outcome expectancies could predict differing patterns of ecstasy use ('light' and 'heavy') among established ecstasy users are then presented. The final section describes the recent sexual behaviour of this sample, and also reports the results of a series of logistic regression equations that examine the role of ecstasy outcome expectancies in predicting ecstasy-related sexual risk-taking compared with other related variables, such as the frequency of ecstasy use.

4.5.1 Sample Characteristics

The majority of participants indicated that they were heterosexual (80%), almost all participants (97%) reported that English was the predominant language they spoke at home, and only a minority (4%) of the sample identified as Aboriginal or Torres Strait Islander (ATSI). The sample generally reported high levels of education: 81% of the sample had completed high-school; half (51%) of the sample having obtained tertiary qualifications since finishing school: and, approximately one quarter (27%) were studying on a full-time basis at the time of interview. Over forty percent (43%) of the sample indicated that they were currently employed on a full-time basis, sixteen percent of the sample were employed on a casual or part-time basis, and a minority (10%) were currently unemployed. Only two participants reported that they were enrolled in some form of drug treatment at present (methadone maintenance, $n = 1$; drug counselling, $n = 1$) and a minority (6%) of the sample had ever been imprisoned.

Consistent with previous studies examining drug use among ecstasy users (Black et al., 2008; Breen et al., 2004; Butler & Montgomery, 2004; Dunn et al., 2007; Lenton et al., 1997; Parrott et al., 2001; Schifano et al., 1998; Solowij et al., 1992; Stafford et al., 2005; Stafford et al., 2006; Strote et al., 2002; Topp, Hando, & Dillon, 1999; Topp, Hando, Dillon et al., 1999), poly drug use was characteristic of this sample. Participants reported a mean of 10 (*SD* = 3.2, *Range* = 3 - 17) drugs ever having been used in their lifetime, and a mean of 6 (*SD* = 1.9, *Range* = 3 -13) drugs having been used in the preceding six months.

Over half the sample (53%) nominated ecstasy as their drug of choice. The mean age at which participants reported first having tried ecstasy was 20 years (*SD* = 4.96, *Range* = 13 – 53), and the mean age at which users reported first having used ecstasy on a regular basis (defined as at least monthly use) was 21 years (*SD* = 5.88, *Range* = 14 – 56). Respondents had used ecstasy on a median of 18 days in the six months prior to interview (*Range* = 6 – 96). In the preceding six months the most common pattern of ecstasy use was on a fortnightly to monthly basis (43%), followed by approximately one third (34%) of participants having typically used ecstasy on a weekly to fortnightly basis, and around one quarter (23%) of the sample indicating that they had used ecstasy on more than one day per week during this period. When adapting the cut-offs employed in former studies (Parrott et al., 2000; Scoda, 2002) to the frequency of ecstasy use observed in this sample, 30% of the sample were identified as 'light' users and 70% of the sample were classified as 'heavy' users.

In addition to the frequency of ecstasy use over the past six months, the quantity of ecstasy used in 'typical' and 'biggest' episodes of use was also assessed. The median number of ecstasy tablets taken by participants in a 'typical' episode of use was two (*Range* = 0.5 – 12), with three quarters (75%) of the sample reporting that they normally used more than one tablet in a 'typical' episode of use. When asked about the quantity of use in their 'heaviest' episode in the preceding six months, the median number of tablets consumed increased to four (*Range* = 1 – 40). Additionally, over half (52%) the sample reported having taken four or more ecstasy tablets in a single use episode in the past six months.

Ecstasy had also been used during extended 'binge' episodes of drug use (defined as having used the substance without sleep for 48 hours or more) by one third (33%) of the sample. The median length of the longest reported binge session on ecstasy in the preceding six months was three days (i.e. 72 hours). Other substances typically consumed with ecstasy during these binge episodes were alcohol (57%), methamphetamine powder (51%), crystal methamphetamine (42%) and cannabis (40%). In addition to the use of other substances with ecstasy during binge episodes, almost the entire (95%) sample indicated that it was common practice to use other substances in combination with ecstasy during 'standard' episodes. Similarly, three quarters (75%) of the sample indicated that they typically used other substances to facilitate the 'comedown' from ecstasy. The substances most commonly used in conjunction with and to 'comedown' from ecstasy were alcohol, cannabis and tobacco.

When examining the routes of ecstasy administration in this sample, all (100%) participants reported swallowing ecstasy in the six months prior to interview, with approximately two thirds (66%) also reporting having snorted the drug, and smaller proportions reporting shelving/shafting (vaginal or anal insertion) (8%), smoking (7%) and the injection (4%) of ecstasy. Almost all (97%) participants nominated oral ingestion as their 'main' route of administration of ecstasy in the past six months.

4.5.2 Ecstasy Outcome Expectancies

The EEQ subscale means obtained in this sample were all within one standard deviation of the mean scores for ecstasy users in the Scoda (2002) study, on which the EEQ was developed (Table 4.1). The internal consistency of the eight EEQ scales as measured by Cronbachs' alpha (α) was Sociability = .77, Manic Mood State = .71, Increased Coping = .75, Sexual Decrement = .74, Sexual Enhancement = .80, Negative Mood State = .78, Cognitive Decrement = .58 and Tension Reduction = .77.

Table 4.2 presents the intercorrelations observed in this sample between the eight EEQ subscales. Consistent with Scoda's (2002) findings, positive intercorrelations were observed among the three subscales that measure positive outcomes expectancies (Sociability, Increased Coping and Tension Reduction subscales; see Table 4.2). Also as expected, positive intercorrelations were observed among the Cognitive Decrement, Sexual Decrement and Negative Mood State subscales, which all measure negative expectancies relating to ecstasy use. Further, the two subscales that relate to both positive and negative outcome expectancies (Sexual Enhancement and Manic Mood State) correlated positively with both positive and negative expectancy scales

A series of statistical tests were conducted to examine potential differences in ecstasy outcome expectancies according to demographic variables. There were no significant differences for ecstasy outcome expectancies as measured by the EEQ subscale means according to sex, sexual orientation (heterosexual and non-heterosexual participants) or state (ACT and NSW). However there were significant negative correlations between the age of participants and scores on two of the EEQ subscales – Sociability and Manic Mood State. Specifically, younger participants were more likely to endorse items representing beliefs that using ecstasy is associated with being more social and empathic ($r = -.16, p < .05$), and that ecstasy use is associated with increased risk-taking and perceptual changes ($r = -.18, p < .01$).

Table 4.1

Means and Standard Deviations for EEQ Subscales in Two Samples

Subscale	Regular Ecstasy Users [a] $N = 220$		Ecstasy Users [b] $N = 147$	
	M	*SD*	*M*	*SD*
Sociability	34.21	5.66	31.76	7.00
Manic Mood State	15.99	5.48	16.59	5.71
Increased Coping	17.26	5.50	16.45	5.59
Sexual Decrement	9.62	5.33	10.88	5.53
Sexual Enhancement	12.00	5.71	12.77	4.42
Negative Mood	11.07	6.05	13.26	6.43
Cognitive Decrement	16.89	4.94	17.97	4.83
Tension Reduction	19.94	4.80	17.87	4.55

[a] Sample from the current study

[b] Sample from Scoda (2002) study

Table 4.2

Intercorrelations Among the EEQ Subscales for Regular Ecstasy Users (N = 220)

	Sociability	Manic Mood State	Increased Coping	Sexual Decrement	Sexual Enhancement	Negative Mood State	Cognitive Decrement	Tension Reduction
Sociability	–							
Manic Mood State	.34**	–						
Increased Coping	.46**	.28**	–					
Sexual Decrement	-.07	.07	.12	–				
Sexual Enhancement	.27**	.38**	.26**	-.28**	–			
Negative Mood	-.09	.42**	-.11	.16*	.10	–		
Cognitive Decrement	.11	.43**	.24**	.34**	.12	.37**	–	
Tension Reduction	.58**	.21**	.46**	.003	.26**	-.03	.14*	–

*$p < .05$, **$p < .01$

One of the aims of this study was to examine whether ecstasy outcome expectancies could predict differing patterns of ecstasy use among established, regular ecstasy users. Table 4.3 presents the results of a series of t-tests that were used to determine if there were any differences in EEQ subscales between 'light' and 'heavy' ecstasy users. In this study, there were no significant differences between 'light' and 'heavy' ecstasy users on the EEQ subscales of Sociability, $t(214) = .51, p > .05$, Manic Mood State, $t(210) = 1.68, p > .05$, Increased Coping, $t(215) = -.03, p > .05$, Sexual Decrement, $t(212) = .70, p > .05$, Negative Mood State, $t(212) = 1.06, p > .05$, Cognitive Decrement, $t(214) = 1.29, p > .05$ and Tension Reduction, $t(212) = 1.60, p > .05$. However 'light' and 'heavy' ecstasy users were differentiated in terms of their scores on the Sexual Enhancement subscale ($t(210) = 2.47, p < .05$). Specifically, 'lighter' ($M = 13.2$, $SD = 4.4$) users more strongly endorsed items on the Sexual Enhancement subscale than 'heavier' ($M = 11.5$, $SD = 4.8$) users. This finding suggested that individuals who typically used ecstasy less than fortnightly (in the past six months), more strongly believed that the use of ecstasy is associated with trying new sexual experiences and sexual disinhibition.

Table 4.3

Means and Standard Deviations for EEQ Subscales According to Frequency of Ecstasy Use

Subscale	Light Ecstasy Users $n = 66$		Heavy Ecstasy Users $n = 154$	
	M	*SD*	*M*	*SD*
Sociability	34.51	5.73	34.08	5.64
Manic Mood State	16.86	4.74	15.60	5.75
Increased Coping	17.25	5.84	17.27	5.36
Sexual Decrement	10.02	5.05	9.46	5.45
Sexual Enhancement	13.20	4.35	11.49*	4.78
Negative Mood	11.73	6.07	10.78	6.04
Cognitive Decrement	17.55	4.86	16.61	4.96
Tension Reduction	20.73	4.80	19.59	4.78

*$p < .05$, **$p < .01$

4.5.3 Sexual Behaviour of Ecstasy Users

Table 4.4 presents data on the sexual practices of this sample in the preceding six months. Almost the entire sample (94%) reported having penetrative sex in the past six

months, where penetrative sex was defined as 'penetration by penis or fist of the vagina or anus'. Of this group, over half (57%) reported having multiple (two or more) sexual partners during this period of time. The majority (86%) of sexually active participants reported having sex with a 'regular' partner in the preceding six months while over half (61%) reported having sex with a 'casual' partner. One in five (21%) reported anal sex (see Table 4.4).

Table 4.4

Sexual Behaviour of 220 Regular Ecstasy Users

	Total (%)
Penetrative sex in past six months	94
Number of sexual partners past six months [a]	
One partner	43
Two partners	22
3-5 partners	29
6-10 partners	4
10+ partners	2
Had sex with a regular partner [a]	86
Always used condoms	26
Inconsistent condom use	74
Had sex with a casual partner [a]	61
Always used condoms	59
Inconsistent condom use	41
Anal sex [a]	21
Monthly or less	70
Fortnightly or less	23
Weekly or less	7

[a] Of those who were sexually active in the past six months, $n = 207$

Among those who had sex with a regular partner in the past six months only one quarter (26%) used condoms on every occasion, with the remaining 74% reporting inconsistent condom use. When examining the frequency of condom use with casual partners, half (59%) reported always using condoms, while more than one-third (41%) reported inconsistent condom use with their casual partners. The pattern of less consistent

condom use with regular, as opposed to casual, partners has been observed in a representative sample of Australian adults (de Visser et al., 2003c) and also in samples of young Australian adults enrolled at university (Van de Ven et al., 2002; Van de Ven et al., 2004). Overall, the frequency of anal sex was relatively low, with 'monthly or less than monthly' frequency being the most common pattern in the past six months (70%), followed by fortnightly or less (23%) and a minority (7%) reporting anal sex on a weekly or less frequency (see Table 4.4).

Eighty four percent of sexually active participants reported having sex under the influence of ecstasy or other party drugs in the past six months (Table 4.5). Almost half (41%) of these respondents indicated that they had had sex under the influence of drugs on at least a monthly basis (i.e. six or more times) in the past six months. The drugs that participants reported most commonly having sex under the influence of the last time they had sex under the influence were: ecstasy (82%); alcohol (56%); cannabis (35%); methamphetamine powder (19%) and cocaine (14%).

Among those who had sex with a regular partner while using ecstasy or other party drugs in the preceding six months (see Table 4.5), over three quarters (77%) reported that they used condoms inconsistently with their regular partner and approximately one quarter (23%) used condoms every time. Among those who had sex with a casual partner while using ecstasy and related drugs in the past six months (Table 4.5) 58% reported always using condoms and almost half (42%) reported inconsistent condom use. It is important to note that although the rates of condom use with both regular and casual partners remained relatively consistent across sexual encounters whether drugs were involved or not, significant proportions of the sample had still engaged in unsafe sex with both regular and casual sexual partners over the past six months.

As explained in the Method, participants in the ACT arm of the study responded to questions that directly assessed whether they had recently had unsafe or unintended sex under the influence of ecstasy. Forty one percent of sexually active participants in the ACT reported having unsafe sex (i.e. sex without a condom) under the influence of ecstasy in the past six months. Over one quarter (28%) of ACT participants reported having unintended sex under the influence of drugs, and the majority (87%) of these participants reported having done so under the influence of ecstasy (24% of sexually active participants; see Table 4.5). Significant proportions of participants also reported having unintended sex

under the influence of alcohol (77%), cannabis (30%), cocaine (27%) and methamphetamine powder ('speed') (23%).

Table 4.5

Sexual Behaviour Under the Influence of Ecstasy and Related Drugs

	Total (%)
Had sex under the influence of ecstasy or party drugs [a]	84
Number of times	
Once	14
Twice	17
3-5 times	28
6-10 times	16
More than 10 times	25
Had sex with a regular partner under the influence [a]	71
Used condoms every time	23
Inconsistent condom use	77
Had sex with a casual partner under the influence [a]	46
Used condoms every time	58
Inconsistent condom use	42
Had unsafe sex under the influence of ecstasy [b]	41
Had unintended sex under the influence of ecstasy [b]	24

[a] Of those who were sexually active in the past six months, $n = 207$

[b] ACT participants only, $n = 108$ respondents

4.5.4 Predicting Risky Sexual Behaviour Under The Influence of Ecstasy

Prior to the logistic regression analysis, a series of statistical tests were conducted to examine which demographic and outcome expectancy variables differed between those participants who had engaged in ecstasy-related sexual activities and those who had not. On the basis of these preliminary results, logistic regression analyses were then conducted to examine which of the relevant variables were significant in predicting the ecstasy-related sex risk behaviours examined. Using the backward elimination method, those variables that were not statistically significant in the regression model were removed if they did not significantly alter the estimates of the remaining variables (Kleinbaum, Kupper, & Muller, 1988).

Participants were asked to nominate which party drugs they used the last time they had penetrative sex under the influence of party drugs. Of those participants who reported using ecstasy and other party drugs while having sex in the previous six months, 82% reported that they used ecstasy on the last sexual encounter when under the influence of party drugs. Participants who had used ecstasy the last time they had sex under the influence did not differ from those who had not according to age, sex, sexual orientation, or frequency of ecstasy use. There were however differences between these groups according to their expectancies regarding the effects of ecstasy. As can be seen in Table 4.6 there were significant differences between participants who reported having sex under the influence of ecstasy and those who did not for three of the EEQ subscales: Sexual Decrement, Sexual Enhancement and Tension Reduction. Specifically, these findings indicated that those participants who reported having sex under the influence of ecstasy in the past six months scored significantly higher than those who had not on the Sexual Enhancement ($t(58.85) = -3.76, p < .000$)[1] and Tension Reduction subscales of the EEQ ($t(167) = -2.05, p < .05$). Individuals who had sex under the influence of ecstasy however scored significantly lower than those who had not on the Sexual Decrement subscale ($t(168) = 3.10, p < .01$).

Table 4.6

Means and Standard Deviations for EEQ Subscales According Sex Under the Influence of Ecstasy

	Sex under influence of ecstasy $n = 142$		No sex under influence of ecstasy $n = 31$	
	M	*SD*	*M*	*SD*
Sociability	34.65	5.35	33.61	5.33
Manic Mood State	15.97	5.58	16.00	5.55
Increased Coping	17.31	5.41	16.26	6.13
Sexual Decrement	8.47	4.96	11.62**	5.16
Sexual Enhancement	12.93	4.73	10.23***	3.27
Negative Mood	11.09	6.07	10.16	5.08
Cognitive Decrement	16.79	5.03	16.55	5.04
Tension Reduction	20.11	4.78	18.16*	4.80

*$p < .05$, **$p < .01$, ***$p < .001$

[1] T-test was computed by SPSS for unequal variances

On the basis of these preliminary findings, the three EEQ subscales were entered into a logistic regression analysis to predict having had sex under the influence of ecstasy in the previous six months. Using a backward elimination logistic regression analysis, the EEQ subscales of Sexual Decrement and Sexual Enhancement emerged as significant predictors of sex under the influence of ecstasy in this model (see Table 4.7). Specifically, as individuals' scores on the Sexual Decrement subscale decreased, the chance of having used ecstasy the last time they had sex increased, and conversely, as scores in the Sexual Enhancement subscale increased, so did the chance of having used ecstasy in the last sexual encounter.

Table 4.7

Final Logistic Regression Model for the Predictors of Sex Under The Influence of Ecstasy

Variable	*B*	*SE*	*p*	*OR (95% CI)*
EEQ Sexual Decrement	-.10	.04	.02	.90 (.83 -. 98)
EEQ Sexual Enhancement	.13	.05	.01	1.14 (1.03 - 1.26)
χ^2 (2, N = 167) = 15.57, p < .000				

Participants in the ACT also responded to whether they had had unsafe or unintended sex under the influence of ecstasy in the past six months. Those who reported unsafe sex under the influence of ecstasy did not differ from those who did not according to sex, age or sexual orientation. Differences did exist however on this measure of sexual risk-taking according to the frequency of recent ecstasy use. Half (50%) of those respondents who used ecstasy on a fortnightly or greater than fortnightly basis reported having unsafe sex under the influence of ecstasy in the previous six months. This was significantly higher than the 22% of 'lighter' ecstasy users who had done so (*OR* = 3.50, *95% CI*: 1.41 – 8.71).

Statistical differences on the ecstasy expectancy scales were observed between participants who had engaged in unsafe sex under the influence of ecstasy and those who had not. The results presented in Table 4.8 indicate that participants who reported having unsafe sex under the influence of ecstasy differed compared to those who had not for three of the EEQ subscales: Sexual Decrement, Sexual Enhancement and Negative Mood State. Specifically, participants who reported having unsafe sex under the influence of ecstasy scored significantly higher than those who did not on the Sexual Enhancement subscale

($t(101) = -3.20, p < .01$). Conversely, participants who had unsafe sex under the influence of ecstasy scored significantly lower than those who hadn't on the Sexual Decrement ($t(104) = 2.64, p < .01$) and Negative Mood State ($t(102) = 2.66, p < .01$) subscales of the EEQ.

Table 4.8

Means and Standard Deviations for EEQ Subscales According to Unsafe Sex Under the Influence of Ecstasy

	Unsafe sex under influence of ecstasy $n = 44$		No unsafe sex under influence of ecstasy $n = 64$	
	M	*SD*	*M*	*SD*
Sociability	34.84	5.17	34.11	6.06
Manic Mood State	14.86	5.13	15.82	5.40
Increased Coping	17.86	5.03	17.00	5.87
Sexual Decrement	8.16	4.24	10.95**	6.02
Sexual Enhancement	13.40	4.93	10.30**	4.79
Negative Mood	8.52	5.30	11.87**	6.90
Cognitive Decrement	15.93	4.76	17.32	5.33
Tension Reduction	19.57	5.00	20.16	4.86

*$p < .05$, **$p < .01$

Based on these preliminary analyses, four variables were then used in a regression equation that was constructed to predict the likelihood of having had unsafe sex under the influence of ecstasy. These were the Sexual Decrement, Sexual Enhancement and Negative Mood subscales of the EEQ, and a dichotomous variable, the frequency of ecstasy use in the preceding six months ('light' versus 'heavy'). When this set of variables was entered into a multivariate logistic regression model using backward elimination, frequency of ecstasy use and two of the EEQ subscales (Sexual Enhancement and Negative Mood) emerged as significant predictors of ecstasy-related unsafe sex (see Table 4.9).

Table 4.9

Final Logistic Regression Model for the Predictors of Unsafe Sex Under the Influence of Ecstasy

Variable	*B*	*SE*	*p*	OR *(95% CI)*
EEQ Sexual Enhancement	.17	.05	.001	1.19 (1.07 - 1.32)
EEQ Negative Mood State	-.10	.04	.009	.90 (.83 - .98)
'Light' v 'Heavy' Ecstasy Use	1.48	.53	.005	4.39 (1.56 – 12.30)
χ^2 (3, N = 103) = 28.07, p < .001				

Similar to the previous regression analysis, as individuals' scores on the Sexual Enhancement subscale increased so did the chance of having had unsafe sex under the influence of ecstasy. Participants who used ecstasy more heavily in the previous six months were also statistically more likely to have had unsafe sex under the influence of ecstasy than those respondents who used ecstasy on a less than fortnightly basis. Finally, as individuals' scores on the Negative Mood subscale decreased, the chance of having had unsafe sex under the influence of ecstasy also increased.

When examining the potential differences between individuals who reported having unintended sex under the influence of ecstasy and those who hadn't, there were again no differences observed according to the demographic variables examined (sex, age or sexual orientation) or the frequency of ecstasy use. Participants who had engaged in this form of ecstasy-related sexual risk-taking differed from those who had not according to only one variable; their score on the Sexual Enhancement subscale. Ecstasy users who reported being involved in unintended sex under the influence of ecstasy in the previous six months (M = 14.26, SD = 4.60) scored significantly higher than those who had not (M = 11.00, SD = 4.94) on the EEQ Sexual Enhancement subscale (t(109) = -2.86, p < .01).

Table 4.10

Final Logistic Regression Model for the Predictors of Unintended Sex Under the Influence of Ecstasy

Variable	*B*	*SE*	*p*	OR *(95% CI)*
EEQ Sexual Enhancement	.14	.05	.01	1.15 (1.04 - 1.27)
χ^2 (1, N = 111) = 7.88, p < .01				

Again using a backward elimination logistic regression analysis, increasing scores on the EEQ Sexual Enhancement subscale emerged as the only predictor of unintended sex under the influence of ecstasy in this model (see Table 4.10). As predicted, as participants' belief in the Sexual Enhancement Subscale increased, so did the likelihood of having engaged in unintended sex under the influence of ecstasy.

4.6 Discussion

4.6.1 Summary of Findings

This study examined the relationship between ecstasy outcome expectancies, frequency of ecstasy use and ecstasy-related 'risky' sexual behaviours in a sample of regular ecstasy using young adults in the ACT and NSW, Australia. The level of sexual risk-taking among this sample was high, with the majority of participants reporting multiple sexual partners, 'casual' sexual encounters, sex under the influence of substances and inconsistent condom use with both regular and casual sexual partners in the previous six months. The key finding of this study was that sex-related ecstasy outcome expectancies were found to reliably predict involvement in recent ecstasy-related sexual encounters. Specifically this study demonstrated that participants who held a specific set of beliefs regarding the outcomes of ecstasy use on sexual behaviour were more likely to have engaged in sex under the influence of ecstasy, and also unsafe and unintended sex under the influence of ecstasy in the past six months. Secondly, consistent with past research, no reliable differences were found between 'light' (less than fortnightly use) and 'heavy' (fortnightly or greater than use) ecstasy users in relation to the expectancies they hold regarding the effects the drug. These findings have the potential to influence future interventions that aim to reduce risky sexual behaviour related to ecstasy use among young people.

4.6.2 Sexual Risk-Taking Behaviour

Sexual risk behaviours that place the individual at increased risk of contracting STIs (such as sex with multiple partners, casual sex, unsafe sex and sex under the influence of substances) were prevalent among this sample of young adult regular ecstasy users. Almost the entire sample (94%) were sexually active in the previous six months, and over half (57%) this group reported having sex with multiple sexual partners in this timeframe. Seventy four percent of individuals who had sex with a 'regular' partner failed to use condoms at least once in the past six months, and 41% who had sex with a 'casual' partner also reported inconsistent condom use during this timeframe. Given that the majority of participants in this study reported having sex with two or more partners in the previous six

months alone, the rates of infrequent condom use reported for sex with both 'regular' and 'casual' partners in this study therefore warrants concern. Additionally, the majority of participants also reported recently having sex under the influence of ecstasy and other drugs; of these, 71% did so with a 'regular' sex partner, and almost half (46%) reported having done so with a 'casual' sex partner in the past six months. Unlike the earlier findings reported by Topp, Hando & Dillon (1999), the rates of condom use in the present sample remained stable across sexual encounters with 'casual' partners that involved ecstasy use and those that did not. However, half (51%) of those participants who reported having sex with a 'regular' partner when under the influence of ecstasy and other party drugs indicated that they never used condoms, an increase from one third (35%) who reported never using condoms with regular partners while not intoxicated. These results suggest that within the context of sex with a 'regular' partner, sexual encounters that place the individual at increased risk for the physical risks associated with sexual activity are more likely after ecstasy use.

This study also examined the relationship between ecstasy use, ecstasy outcome expectancies and ecstasy-related sexual risk taking behaviour. The majority of previous research that has been conducted examining the relationship between ecstasy use and sexual risk behaviour has been conducted outside of Australia and is specific to homosexual male populations (Choi et al., 2005; Klitzman et al., 2002; Klitzman et al., 2000; Mattison et al., 2001; Waldo et al., 2000). This study however provides further evidence that supports the link between ecstasy use and unsafe sexual behaviour, in a sample of young Australian adults who predominantly identified as heterosexual. Forty one percent of sexually active participants in the ACT reported having unsafe sex (i.e. sex without a condom) under the influence of ecstasy in the past six months and almost one quarter (24%) of ACT participants reported having unintended sex under the influence of ecstasy.

The central finding of this study was that individuals who held stronger expectations that ecstasy would disinhibit them sexually, were more likely to report having been involved in a series of ecstasy related 'risky' sexual behaviours in the past six months. Those individuals who engaged in ecstasy related sexual risk-taking endorsed the following items comprising the Sexual Enhancement subscale of the EEQ more strongly than individuals who had not engaged in these forms of sexual risk-taking: a) that individuals are more likely to have sex; b) are more likely to have casual sex; and c) are more comfortable trying different sexual experiences as a result of ecstasy use. However, two other ecstasy-

related expectancies – the Sexual Decrement and Negative Mood State subscales – were also shown to predict ecstasy-related sexual behaviour. Not surprisingly, those participants who were less likely to endorse statements suggesting that ecstasy use is related to impaired sexual performance were more likely to have used ecstasy the last time they had sex under the influence of substances. Additionally, respondents who did not strongly endorse items on the Negative Mood State subscale (which reflects beliefs that ecstasy use is associated with depressive mood effects) were more likely to have reported unsafe sex under the influence of ecstasy in the past six months. However, the Sexual Enhancement subscale of the EEQ was the only variable that was found to reliably predict having sex under the influence of ecstasy, having unsafe sex under the influence of ecstasy and having unintended sex under the influence of ecstasy. Contrary to the predictions of this study, outcome expectancies relating to impaired judgement and the increase in general risk-taking that may result from ecstasy use (as measured by the Manic Mood State subscale) did not differentiate between those participants who reported risky sexual behaviours under the influence of ecstasy and those who did not. It would appear instead that those expectancies that relate to specific effects of ecstasy on sexual behaviour are important in predicting ecstasy-related sexual risk-taking. Therefore, consistent with the alcohol outcome expectancy and sexual risk-taking literature (Dermen & Cooper, 1994b, 2000; Dermen et al., 1998; Fromme et al., 1999; Gordon et al., 1997; Leigh, 1990), these results support the theory that changes in the sexual behaviour of humans that result from ecstasy use, can be interpreted, at least in part, as being associated with the outcomes they expect to experience from consuming ecstasy.

This study also demonstrated the importance of another variable, the frequency of ecstasy use, in predicting ecstasy-related unsafe sex. The results of a recent examination of HIV risk among 'heavy' and 'non-heavy' ecstasy users are consistent with the current findings, also suggesting that heavier ecstasy use patterns are associated with unsafe sex related to ecstasy use (Theall et al., 2006). The findings in the present study, however, indicate that all three forms of sexual risk-taking were more likely among those individuals who reported stronger expectancies for the sexually disinhibiting properties of ecstasy, and in the case of 'unsafe sex', this relationship persisted after statistically adjusting for level of ecstasy use. These results suggest therefore that it is not simply an issue of how much or how often ecstasy is consumed, but that an individual's beliefs regarding the effects of ecstasy can also exert influence on their sexual behaviour when intoxicated.

4.6.3 Outcome Expectancies and the Frequency of Ecstasy Use

In this study, ecstasy outcome expectancies did not reliably predict differences in ecstasy use patterns. This study is now one of three that have failed to differentiate between 'light' and 'heavy' ecstasy users on the basis of ecstasy outcome expectancies (Engels & ter Bogt, 2004; Scoda, 2002) and is therefore contrary to research that has documented differences in outcome expectancies between 'heavy' and less frequent users of other substances such as cocaine and alcohol. However, studies examining differences in outcome expectancies between non-problematic and problematic cocaine and alcohol users typically defined those individuals who demonstrate a chronic dependence on the substance examined (i.e. at least daily use) as 'heavy' users (Galen & Henderson, 1999; Jaffe & Kilbey, 1994; Lewis & O'Neill, 2000). Although there appears to be a relationship between an increase in psychobiological problems experienced with heavier (frequency) levels of ecstasy use (Parrott et al., 2000; Schifano, 2000; Schifano et al., 1998), ecstasy users in general do not appear to be a group that develop chronic levels of dependency characterised by compulsive daily administration. The median frequency of ecstasy use reported for this sample was slightly more than fortnightly, which is consistent with other studies that have examined patterns of ecstasy use in Australian samples (Black et al., 2008; Breen et al., 2004; Proudfoot & Ward, 2004; Stafford et al., 2005; Stafford et al., 2006; Topp, Hando, & Dillon, 1999; Topp, Hando, Dillon et al., 1999; B. White, Breen, & Degenhardt, 2003). Given that most ecstasy users do not characteristically use on a daily basis, it is less likely that they would experience negative effects associated with heavy compulsive drug use and as a consequence it is unlikely that negative expectancies about heavy use would evolve (Scoda, 2002). Therefore, it can be concluded that although outcome expectancies can predict ecstasy use versus non-use (Scoda, 2002), 'light' and 'heavy' ecstasy users cannot be differentiated according to the beliefs they hold regarding the effects of ecstasy. These findings suggest that the role that expectancies play in predicting substance use varies according to whether the drug has the potential to induce compulsive daily use or not.

4.6.4 Limitations of the Current Study and Directions for Future Research

In the current study the 'snowball' sampling technique was employed to recruit the sample of regular ecstasy users obtained. Therefore, caution should be exercised when attempting to generalise the findings from this study to the broader ecstasy using population. With this limitation acknowledged, however, it is important to note that the sample of ecstasy users recruited in the current study were comparable to typical 'ecstasy using' samples recruited previously both in Australia and also from overseas.

This study provided evidence to suggest that like alcohol, outcome expectancies regarding the effects of ecstasy on sexual behaviour were reliably associated with recent participation in ecstasy related sexual risk-taking. However, the literature reviewed in the previous chapter indicates that the relationship between substance use and risky sexual behaviours is a complicated one, and is reflective of a number of interacting processes rather than a single mechanism (Cooper, 2006; Degenhardt, 2005). For example, results from the current study indicate that both outcome expectancies and the frequency of ecstasy use were important in predicting unsafe sex under the influence of ecstasy.

While the current study provided evidence to support the role of outcome expectancies in predicting ecstasy related sexual risk-taking, it did not control for the possible predictive effects of enduring aspects of personality in explaining these behaviours. The next chapter of this thesis reports on a study that was conducted to investigate whether personality traits are able to predict ecstasy related sexual risk-taking among a group of regular ecstasy users.

CHAPTER FIVE

Personality, Outcome Expectancies and Sexual Risk-Taking

5.1 General Introduction

The literature reviewed in Chapter Three demonstrates that in addition to predicting substance use in general, outcome expectancies are also specifically associated with risky sexual behaviour that occurs when individuals are intoxicated. Theories such as the cognitive impairment and outcome expectancy paradigms have been widely used to explain the association between substance use and a variety of disinhibited behaviours. In addition to these frameworks, 'third variable' explanations which focus on the stable personality traits of the individual have also been proposed to account for a variety of risk behaviours.

Consistent with the large body of literature exploring the relationship between alcohol use and sexual behaviour, the key finding in the first study of this thesis (Chapter Four) was that individuals who held stronger beliefs that ecstasy would disinhibit them sexually were more likely to have engaged in risky sexual practices whilst under the influence of ecstasy. The current chapter reports on the results of a study conducted to assess whether, in a group of regular ecstasy users, personality traits play a role in addition to expectancies in predicting risky sexual behaviours that occur whilst under the influence of ecstasy. Firstly, a review of the literature investigating the relationship between personality and sexual risk-taking will be presented. This review is followed by an examination of the small body of research that has been conducted so far to explore the personality profiles of ecstasy users.

5.2 The Role of Personality in Understanding Sexual Risk-Taking Behaviour

In the broader risk-taking literature, personality has been identified as one of the primary risk factors that predispose individuals to engage in behaviours that pose significant risk to their physical and psychological well-being (Hoyle et al., 2000). Personality theorists focus on identifying relatively enduring individual differences that predispose individuals to characteristic styles of action and experiences and are therefore helpful in identifying individuals at 'high-risk' for involvement in certain behaviours. The seminal research in this area was guided by the assumption that similar aspects of

personality contribute to all risk behaviours, such that the personality traits predisposing an individual to engage in one form of 'risky' behaviour, for example drug use, would also influence their involvement in another, such as unsafe sex (Hoyle, 2000). Contrary to this theory, more recent research supports a multi-dimensional model for risk-taking behaviour (Katz et al., 2000). For example, in a study that explored whether three highly intercorrelated aspects of risk-taking were best represented by a single or multi-dimensional model, the results of factor analyses clearly indicated that heavy drinking, drug use and unsafe sexual behaviour represented distinct categories of risk-taking that are characterised by different determinants. Consistent with this finding, recent reviews of the risk-taking literature suggest that different personality traits may influence involvement in different forms of risky sexual activity (Hoyle et al., 2000).

Although many models of personality now exist, trait models can be divided into two types: psychobiological and descriptive models (Hoyle et al., 2000). Psychobiological models such as Eysenck's Psychoticism-Extraversion-Neuroticism (PEN) Model and Zuckerman & Kuhlman's five factor model propose that broad personality traits have biological bases. For example, Eysenck and Zuckerman based their models of personality on the notion that personality traits are related to specific aspects of brain functioning. The facets of human personality included in psychobiological models are therefore defined as being heritable, developmentally stable, and relatively uninfluenced by cultural factors (Dughiero, Schifano, & Forza, 2001). An identified strength of psychobiological theories of personality is that they specify the mechanisms underlying human personality and the impact of these on human behaviour (Hendershot et al., 2007). Alternatively empirically derived taxonomies, the most well known being Costa & McCrae's five factor model, are founded in questionnaire studies and do not assume any underlying biological basis for the dimensions of personality that they discover. These models are by nature atheoretical, typically resulting from factor analyses of responses to a large number of questionnaire items or trait terms (Hoyle et al., 2000).

Despite the apparent differences in their core assumptions, most prominent models of personality identify five broad traits constituting human personality. These include neuroticism and traits relating to sensation-seeking and impulsivity as 'core' aspects or dimensions of personality. Strong empirical evidence links these dimensions of personality to involvement in a number of generalised risk-taking behaviours (for example see Cooper et al., 2000; Ball & Schottenfeld, 1997). Additionally, a body of research that explores the relationship between neuroticism and impulsive sensation-seeking and sexual risk-taking is

accumulating and the findings to date have considered the measurement of personality traits from both the psychobiological and taxonomic perspectives. This review will focus on the findings that relate to these two aspects of personality, based on their potential theoretical importance in understanding risky sexual behaviour.

5.2.1 Sensation-Seeking and Impulsivity

Sensation-seeking is classified as a core component of personality in Zuckerman and Kuhlman's five factor model. Psychobiological theorists are supported in their assertion that sensation-seeking qualifies as a primary dimension of personality (Zuckerman, 1994b, 2005; Zuckerman & Cloninger, 1996) by the solid biological basis and high heritability that has been established for this trait. Sensation-seeking has been defined as 'the seeking of varied, novel, complex and intense sensations and experiences and the willingness to take physical, social, legal and financial risks for the sake of such experience' (Zuckerman, 1994c, p.27). One of the defining features of the 'high' sensation-seeker, therefore, is that their desire to experience exciting and novel sensations motivates them to engage in or even seek out activities that others by contrast would deem too risky. For many individuals, sexual activity and behaviour is a key behaviour through which their sensation-seeking tendencies are expressed. By definition, sensation-seekers crave variety and change and the prediction follows that high sensation-seekers should exhibit greater variety and perhaps greater risk in their sexual lives (Zuckerman, 1994a). This hypothesis was initially supported by findings that indicated both males and females high in sensation-seeking generally have more permissive attitudes towards sex. This group also report engaging in more diverse types of sexual experience with more partners than their low sensation-seeking counterparts (Zuckerman, 1994a).

Definitions of impulsivity are generally thought to involve two key components. The first of these is the tendency to readily give in to impulses, urges or desires rather than trying to resist them, and the second is the propensity to respond immediately to a stimulus rather than planning or reflecting prior to taking action (Cooper et al., 2000). It follows therefore that when faced with a situation involving conflict between immediate positive and distant negative consequences, the impulsive individual follows a course of action that maximises immediate satisfaction (Cooper et al., 2000).

Based on the above definitions, it is easy to understand why these personality traits have conceptually been related to generalised risk-taking behaviour and in turn have received the greatest part of the research focus to date. Psychobiological theorists have

posited that both sensation-seeking and impulsivity typify the 'approach' aspect of the conflict between reward and risk. On this basis, sensation-seeking and impulsivity were combined into a 'super-trait' called impulsive sensation-seeking (Zuckerman, 1994b) in Zuckerman and Kuhlman's theory of personality. In both their individual and combined forms, sensation-seeking and impulsivity have been the most frequently studied traits examined in relation to sexual risk-taking behaviour to date. It is important to acknowledge at this point that psychobiological theorists do not argue that individuals high on sensation seeking and impulsivity are directly motivated to seek out 'risky' behaviours. Rather, it is understood that these individuals' characteristic high level of involvement in risky behaviours is a consequence of their disposition towards behaviours in general that involve a significant element of risk. For example, it has been demonstrated that in comparison to 'low' sensation-seekers, 'high' sensation-seekers tend to appraise lower risk for 'new' activities and in addition anticipate experiencing less anxiety if they were faced with a new situation that involved significant risk (Zuckerman, 1994a). Rather than the motivation to specifically 'seek out' risky behaviours, therefore, the pairing of lower perceived risk and lower anticipated anxiety increases the likelihood of 'high' sensation seekers engaging in such activities when they are faced with opportunity to do so (Zuckerman & Kuhlman, 2000). In accordance with theoretical expectations, the relationship between these personality factors and sexual risk-taking, although at times inconsistent, is on the whole a positive one. Indeed most (Cooper et al., 2000; Hayaki, Anderson, & Stein, 2006; Hoyle et al., 2000; Miller et al., 2004; Schafer, Blanchard, & Fals-Stewart, 1994; Temple, Leigh, & Schafer, 1993; Trobst et al., 2002; Trobst et al., 2000; Zuckerman & Kuhlman, 2000) but not all (Arnett, 1991; Dudley, Rostosky, Korfhage, & Zimmerman, 2004; Katz et al., 2000; McCoul & Haslam, 2001) studies published have supported this link.

Studies that have employed measurements of personality derived from taxonomic approaches attest to the association between aspects of personality related to sensation-seeking and impulsivity and risky sex. In taxonomic five factor models, personality domains that coalesce around low agreeableness and low conscientiousness are most closely related to the impulsive sensation-seeking construct as represented in Zuckerman and Kuhlman's model (Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993). In a number of studies direct links between risky sex and low levels of agreeableness and conscientiousness have been confirmed (Hoyle et al., 2000; Miller et al., 2004; Trobst et al., 2002; Trobst et al., 2000). For example, Trobst et al. (2002) stratified a sample of disadvantaged individuals who participated in a HIV risk reduction program into three 'risk' groups (low, medium and high) based on their substance use and sexual practices. The personality correlates

associated with each group were then examined – this study found that low levels of conscientiousness and agreeableness were associated with a number of risky sexual practices. Furthermore, Miller et al. (2004) found, in a community sample of young adults, that low levels of agreeableness were related to a series of high risk sexual behaviours, such as having sex outside of the primary relationship and an increased number of sexual partners. In addition, both low levels of agreeableness and conscientiousness were shown to be related to the use of drugs or alcohol before or during sex.

Impulsive sensation-seeking is considered the most robust personality correlate of high-risk sexual behaviour (Hoyle et al., 2000; Zuckerman & Kuhlman, 2000) in the research that has, to date, employed measures of personality based on Zuckerman and Kuhlman's theory. For example, Zuckerman & Kuhlman (2000) report a study in which the relationships between personality and six areas of risk-taking behaviour, including sexual risk-taking, were examined in a sample of 260 college students. To assess for risky sexual behaviour, participants responded to questions that related to a number of sexual practices. In addition to predicting the generalised measure of risk-taking, Zuckerman & Kuhlman (2000) established that impulsive sensation-seeking (in addition to aggression-hostility) was strongly associated with sexual risk-taking on a behaviour-specific level of analysis.

A meta-analysis of the personality and sexual risk-taking literature carried out by Hoyle et al. (2000) also offers strong support for the suggestion that individuals high in sensation-seeking are more likely to engage in risky sexual behaviour than others. There were two criteria for inclusion in the review. First, each study was required to include a standard measure of at least one domain-level factor from one of the major models of personality. Second, only statistical effect sizes that reflected the association between personality and sexual risk-taking behaviour specifically, rather than attitudes, were included. On the basis of the 53 studies included in the meta-analysis, Hoyle et al. (2000) concluded that sensation-seeking was found to predict all forms of risky sexual behaviour included in the review. When comparing the effect size for sensation-seeking across different populations, the strongest effect of sensation-seeking in predicting sexual risk-taking was observed among college students and 'high-risk' populations, in comparison to non-college or 'typical' risk samples.

Some studies that have examined personality in relation to sexual risk-taking have employed a measure of sensation-seeking that distinctively assesses an individual's

proclivity towards sexual interests and activities in particular, appropriately named 'sexual sensation-seeking' (Kalichman & Rompa, 1995). In general, studies employing this specific measure of sensation-seeking have also supported the role of this variable in understanding sexual risk-taking. Sexual sensation-seeking was found to predict a composite index of risky sexual behaviour among a sample of South African University students (Mashegoane, Moalusi, Ngoepe, & Peltzer, 2002) and also predicted the frequency of unprotected anal intercourse (UAI) over a three month period in a sample of gay and bisexual men (Kalichman, Heckman, & Kelly, 1996). Kalichman and colleagues also formulated and tested a conceptual model of substance-related sexual risk-taking that incorporated personality in the specific form of sexual sensation-seeking. In this model Kalichman et al. (1998) proposed that sexual sensation-seeking tendencies would predict a stronger endorsement of expectancies relating to enhancement effects of substance use on sexual behaviour and in turn, that these positive expectancies would promote involvement in risky sexual activities through more frequent substance use in sexual contexts. In addition to confirming this model, the results demonstrated that sexual sensation-seeking accounted for variance in sexual behaviour over and above the use of substances proximal to sexual intercourse. This model was initially validated in a sample of gay and bisexual men (Kalichman et al., 1998) but has also more recently been supported in heterosexual samples involving both males and females (Hendershot et al., 2007; Kalichman & Cain, 2004). In addition to findings that assert the role of sexual sensation-seeking in understanding sexual risk-taking, the strong support that has also been observed for general sensation-seeking tendencies in predicting risky sex, supports the notion of a basic personality disposition that places some individuals at greater risk for engaging in high risk sexual behaviour.

After sensation-seeking, impulsivity has been the next most widely investigated personality trait in sexual risk-taking literature. Hoyle et al. (2000) concluded on the basis of their meta-analysis that the positive association between impulsivity and sexual risk-taking was not as strong as that observed for sensation-seeking. In explaining this pattern of results, Hoyle et al. (2000) suggested that these findings may be a consequence of the conflicting placement of impulsivity across the various models of personality. For example, in Zuckerman and Kuhlman's model, impulsive sensation-seeking is identified as a fundamental dimension of personality, whereas in Costa and McCrae's five factor model, impulsivity is treated as a facet of neuroticism (Zuckerman & Cloninger, 1996).

Since Hoyle and colleagues' (2000) review, additional studies have supported the unique predictive role of impulsivity related to risky sex. For example, using Costa and

McCrae's five factor model of personality, Trobst et al. (2002) reported that individuals considered 'high-risk' (based on their involvement in a variety of practices related to HIV transmission) differed from 'low' and 'medium' risk groups on the impulsive facet of the neuroticism factor. Cooper et al. (2000) also supported the notion that some risky behaviours arise as a direct result of poor impulse control. In a representative community sample of young adults, Cooper et al. (2000) tested a motivational model of risky sex in which personality influences were hypothesised to indirectly influence reasons for engaging in sexual risk behaviour. In this study, impulsivity was found to directly predict both heavy drinking and inconsistent condom use.

Some research has also examined the relationship between trait impulsivity, substance use and risky sexual behaviour more specifically. For example, in Temple et al.'s (1993) study of alcohol and sexual risk-taking, inconsistent condom use appeared to be unrelated to alcohol use at the event level, but a relationship between inconsistent condom use, a measure of impulsivity and general risk-taking was found. In a subsequent re-analysis of these results, focussing on the potential impact of other substance use on inconsistent condom use, Schafer et al. (1994) concluded that those individuals who used drugs and also reported inconsistent condom use scored significantly higher on measures of impulsivity and risk-taking than those who either did not use drugs, or used drugs in sexual encounters with a condom.

Until recently only a small number of studies have examined the specific association between impulsivity and sexual risk-taking among regular substance users. Addressing this gap in the literature, Hayaki et al. (2006) investigated whether impulsivity was able to predict risky sexual behaviour among established heroin and cocaine users. As measured by Eysenck's Impulsivity Scale, trait impulsivity was significantly associated with an overall index of sexual risk-taking and also with each of the component items, as well as a measure of sexual encounter frequency in the six months prior. In addition, this relationship persisted after adjustment for demographic variables and also, importantly, the frequency of substance use (Hayaki et al., 2006).

5.2.2 Neuroticism

Almost all trait models of personality include neuroticism as a component. In spite of the differences in the constitution of the neuroticism factor, all models exhibit a tight factor structure and correlate highly with each other (Zuckerman et al., 1993). The personality trait of neuroticism is broadly a measure of emotional instability and negative

emotionality. At the heart of this trait are the experiences that underlie anxiety and depression (Zuckerman et al., 1993), states that are often accompanied by guilt and low self-esteem (Pinkerton & Abramson, 1995; Zuckerman et al., 1993). Not surprisingly then, neuroticism is the only basic factor or component of personality that has been reliably linked with mood disorders (Zuckerman, 2005). With respect to sexuality, neuroticism has been associated with a number of features related to challenging aspects of sexual behaviour. Increased levels of neuroticism, for example, have been associated with sexual dissatisfaction and marital distress and a tendency towards more liberal sexual standards and attitudes (Schmitt, 2004).

Neuroticism has frequently been included in theoretical models of risk-taking behaviour. However, precisely how this personality trait may lead to increased involvement in risky sexual behaviour remains a topic for debate. For example, some have argued that neurotic individuals are less capable of withstanding their cravings and impulses than are emotionally stable individuals (Trobst et al., 2002). Others have contended that neurotic individuals may lack the required assertiveness to refuse a sexual partner's request to participate in risky sexual activities (McCown, 1991). The characteristic pairing of low self-esteem and increased anxiety of the neurotic individual may therefore inhibit the enactment of safe sex precautions such as condom use, even if the individual is aware of such a need and in fact wishes to enact these protective measures (Pinkerton & Abramson, 1995). A more well-developed theory is that those individuals with higher levels of emotional distress, i.e. those who are more neurotic, seek out sexual risk-taking or promiscuous sexuality as a method of coping with their negative mood states. This theory is grounded on the knowledge that alcohol and drug use often result from attempts to relieve negative moods such as anxiety and depression (Carrigan & Randall, 2003; Cooper et al., 2000; Loukas, Krull, Chassin, & Carle, 2000). For example, Loukas et al. (2000) reported that individuals high on neuroticism placed greater emphasis on the use of alcohol as a way to manage or ease the aversive feelings they were experiencing. In findings related to these, Cooper et al. (2000) linked neuroticism to motive subscales for involvement in problematic alcohol use and also risky sex, wherein individuals high in neuroticism reported drinking to cope with negative affect.

When it comes to sexual risk-taking behaviour, the literature provides highly conflicting evidence regarding the role of neuroticism (Ball & Schottenfeld, 1997; Fontaine, 1994; Hoyle et al., 2000; McCown, 1991; Miller et al., 2004; Trobst et al., 2002; Trobst et al., 2000; Vollrath, Knoch, & Cassano, 1999; Vollrath & Torgersen, 2002). Based on their

review of the available literature at the time, Hoyle et al. (2000) reported that neuroticism was weakly related to an increased number of sexual partners, but that a moderately strong relationship was observed between neuroticism and sex without a condom. Additional studies have since been conducted, with some supporting a relationship between elevated levels of neuroticism and sexual risk-taking (Trobst et al., 2002; Trobst et al., 2000) and others failing to support this association (Miller et al., 2004; Schmitt, 2004; Vollrath et al., 1999; Vollrath & Torgersen, 2002).

Trobst and colleagues found support for an association between elevated levels of neuroticism and risky sexual behaviour in a sample of economically disadvantaged men and women (Trobst et al., 2002; Trobst et al., 2000). Considering both sexual and non-sexual behaviours that result in risk for HIV transmission, the personality correlates of HIV risk behaviour were examined by placing individuals into one of three risk groups (low, medium and high), based on a thorough assessment of their risk history. These results confirmed that, in addition to being more likely to engage in risky behaviours more generally, individuals high in neuroticism engaged more often in risky sexual practices than those who scored low on a measure of neuroticism. Further strengthening this association were the results of later comparisons between the three risk groups, demonstrating that the 'high' risk group obtained significantly higher neuroticism scores than the 'medium' risk group, who also in turn scored higher on neuroticism than the 'low' risk group. In addition, the three risk categories were not differentiated according to their scores on the measure of sensation-seeking utilised. The authors asserted that these findings supported the hypothesis of Cooper et al. (2000) that individuals who engage in these behaviours are not merely doing so for 'thrills or kicks,' but as a way of coping with aversive mood states.

In contrast to these positive findings, Miller et al. (2004) found that neuroticism was not significantly related to any of six 'risk-taking' variables, including sexual risk-taking, in a community sample. Similarly, Vollrath et al. (1999) found no evidence for an association between neuroticism and generalised and also more specific sexual risk-taking behaviour, having also found that neuroticism was positively related to perceived susceptibility to a number of health risks, including the contraction of STIs and AIDS. In a subsequent study, Vollrath & Torgersen (2002) again examined the relationship between personality and risk-taking, this time using a different measure of personality. Built on three of the core components of personality in the Five Factor Model – neuroticism, extraversion and conscientiousness – Vollrath & Torgersen (2002) combined high and low scores of each of these factors, resulting in eight personality 'types' which were

subsequently examined in relation to risk-taking outcomes. In support of the implied link between neuroticism and risky behaviour, 'insecures', a personality type defined by low levels of conscientiousness and high levels of neuroticism, were found to engage in multiple risky health behaviours. Despite this finding, no relationship between this personality type and any of the measures of sexual risk-taking behaviour (new sexual relationship, unsafe sex with new partner and one night stand) was found.

Studies that have used a psychobiological framework for understanding personality have also reported mixed results in relation to the neuroticism and risky sex link. For example, employing Eysenck's personality questionnaire, McCown (1991) investigated the relationship between personality and behavioural change in a sample of primarily gay male individuals who had completed an HIV education course. In a six-month follow-up, 86 participants then completed the brief EPQ-R and seven additional measures as indices of their engagement in unsafe sexual practices. The results of the seven items were correlated to provide a single index of unsafe HIV-related practice. On the basis of previous findings, McCown (1991) had predicted that extraversion and psychoticism (both related to impulsivity) would correlate to unsafe sexual practices. In addition to confirming these predictions, McCown (1991) also documented a strong positive relationship between high levels of neuroticism and levels of engagement in unsafe sex and that the strength of this correlation was comparable to the magnitude of the relationship between extraversion and unsafe sex. However, in another study also using the EPQ-R to examine the relationship between personality and sexual risk-practices, Fontaine (1994) reported a set of results that directly contrasted with McCown's (1991) findings. Employing a relatively small sample (N = 74), of young adult males, most (89%) of whom identified as being single at the time, the participants responded to a 13-item questionnaire designed specifically for the study to measure the extent to which subjects engaged in a variety of forms of sexual activity. Consistent with McCown's (1991) results they found that psychoticism correlated positively with a number of the 'risky' sexual behaviours assessed. However, no strong association between extraversion and sexual risk-taking was observed and neuroticism did not correlate with any of the 13 forms of risky sexual activity assessed.

There is only one known study to date that has considered facets of personality other than impulsive sensation-seeking when examining the relationship between sexual risk-taking and Zuckerman and Kuhlman's model of personality (Ball & Schottenfeld, 1997). Interestingly, this study has provided support for the role of neuroticism (as conceptualised within the model) in predicting risky sexual behaviour. Ball & Schottenfeld

(1997) conducted their study using a 'high risk' sample of pregnant or postpartum women in outpatient treatment, all of whom met the relevant diagnostic criteria for current cocaine abuse or dependence. As part of a broader examination between personality, addiction severity, psychiatric symptoms and objective AIDS risk behaviours, Ball & Schottenfeld (1997) also conducted a set of analyses to examine the relationship between personality and specific sexual AIDS risk behaviours. The initial analyses revealed that those women who reported having sex with multiple partners, who had sex to obtain drugs or money and who were tested multiple times for HIV, scored significantly higher on measures of neuroticism-anxiety, aggression-hostility and impulsive sensation-seeking than those who did not. Given that the observed correlations between these three personality traits and the related risk variables were all relatively and comparably strong, Ball & Schottenfeld (1997) conducted further analyses in order to examine the individual association between each personality factor and the risk-taking measures, after controlling for the effects of the other two traits. In perhaps the strongest set of findings yet that support a link between neuroticism and sexual risk-taking, neuroticism-anxiety was the sole personality domain for which this relationship remained significant when controlling for the effects of the other two traits. Ball and Schottenfeld (1997) concluded on the basis of these results that for peri-natal cocaine users, involvement in sexual risk-taking is primarily determined by their level of negative affect while sociopathic traits (impulsive sensation-seeking and aggression-hostility) are secondary to this link.

5.2.2.1 'Sexual Neuroticism'

Research studies that explore the human self-concept indicate this construct is dynamic and multi-dimensional (Markus & Wurf, 1987). Within this construct, theorists have posited that each individual possesses a series of cognitive representations about themselves, specific to certain domains. It follows that specific cognitive representations exert their influence on human behaviour when they are activated within their respective contexts, such as in regard to one's sexual life. This view is consistent with the conceptualisation of human sexuality as a discrete component of an individual's personality (Anderson & Cyranowski, 1994; Anderson, Cyranowski, & Espindle, 1999; Cyranowski & Anderson, 1998, 2000), a construct which has been termed the 'sexual self-schema'.

The sexual self-schema has been defined as a cognitive representation that relates to the sexual aspects of one's own identity and serves to guide the processing of sexually relevant information (Anderson & Cyranowski, 1994; Cyranowski & Anderson, 2000). Sexual self-schemas not only reflect past experience but are evident in current sexual

cognition and thus influence an individual's sexual behaviour by interpreting and organising perceptual and behavioural responses within sexual situations (Anderson & Cyranowski, 1994; Anderson et al., 1999; Cyranowski & Anderson, 1998, 2000). Anderson & Cyranowski (1994) first operationalised the sexual self-schema construct in relation to female sexuality. Research subsequent to this initial study has established the functional utility of the sexual self-schema construct, demonstrating that differences in the sexual self view for both males and females correspond with reliable differences in sexual attitudes, sexual responsiveness and importantly sexual behaviour (Anderson & Cyranowski, 1994; Anderson et al., 1999; Cyranowski & Anderson, 1998, 2000).

For males, Anderson et al. (1999) established that the sexual self-schema is a uni-dimensional construct existing along one positive dimension, composed of three sub-factors relating to particular aspects of the male sexual self-schema: Passionate/Loving; Powerful/Aggressive and Open-Minded/Liberal. The male sexual self-schema is described along a continuum ranging from 'sexually aschematic' (low-scoring), to 'sexually schematic' (high-scoring). By definition, 'a sexually schematic man is one who experiences emotions of passion and love, yet sees himself as being powerful and aggressive, and is open-minded and liberal in his sexual attitudes' (Anderson et al. 1999, p656). The research demonstrates that sexually 'aschematic' and 'schematic' men differ not only in terms of the view they hold of themselves as a sexual being, but also in terms of their current and past sexual behaviour. It has been established that in comparison to a sexually 'aschematic' male, a 'schematic' male reports higher levels of sexual arousal, is more sexually experienced with a higher frequency of sexual (and often transient) relationships and also has a more diverse history of sexual behaviours that they have engaged in (Anderson et al., 1999).

Contrasting to the one-dimensional construct used to assess male sexual self-schema, Anderson and Cyranowski (1994) found that the female sexual self-schema includes two positive aspects (Passionate/Romantic and Open/Direct) and also a negative component (Embarrassed/Conservative) that inhibits the expression of sexual affect and behaviours. Anderson and Cyranowski's research has distinguished between females who score on the opposite ends – 'negative' or 'positive' – of a single bipolar continuum. A female holding a strong 'positive' sexual self-schema defines herself by characteristics of warmth, openness, directness and romanticism (Anderson & Cyranowski, 1994; Cyranowski & Anderson, 1998, 2000). Anderson & Cyranowski (1994, p1094) state that 'these women tend to be liberal in their sexual attitudes and are generally free of such social inhibitions as self consciousness or embarrassment'. In direct contrast, a female possessing

a clearly 'negative' sexual self-schema is defined by self-consciousness regarding sex; she describes herself as relatively unromantic, emotionally cold, and believes herself to be sexually inhibited in romantic relationships (Anderson & Cyranowski, 1994; Cyranowski & Anderson, 1998, 2000). When differentiating females with contrasting sexual self-views on behavioural dimensions, the research has consistently shown that females with 'positive' sexual self-schemas report; higher levels of sexual arousal across sexual situations, having had more sexual partners, that they are more likely to have engaged in uncommitted sexual relations such as 'one-night stands', as well as having experienced a wider range of sexual activities in their lifetime (Anderson & Cyranowski, 1994; Anderson et al., 1999; Cyranowski & Anderson, 1998, 2000). Further research has also supported a bivariate model of female sexual self-schema, in which positive and negative views of the sexual self are assessed as independent dimensions and females with 'positive' and 'negative' sexual self-schemas can be differentiated from those who are aschematic (holding weak positive and weak negative views) and co-schematic (holding both strong positive and strong negative self-views).

Two key differences in the conceptualisation of male and female sexual self-schema have been identified in the sexual self-schema research (Anderson & Cyranowski, 1994; Anderson et al., 1999; Cyranowski & Anderson, 1998, 2000). In the first instance, the male sexual self-schema is characterised by a dimension of sexual 'aggression', as represented in the Powerful/Aggressive factor. The Powerful/Aggressive factor reflects the extent to which a male views himself as being powerful, experienced, individualistic and domineering, with no corresponding dimension in the female sexual self-concept (Anderson et al., 1999). Anderson et al. (1999) reported that this dimension of male sexuality relates to the motivation for sexual activity and is strongly associated with various dimensions of sexual behaviour such as number of sexual partners and sexually coercive behaviour. The identification of this dimension in respect to male sexuality is consistent with a body of research that has recognised that men tend to 'take the lead' in sexual interactions (behaviourally and also in their sexual fantasies) both during the early stages of a relationship and also in long-term relationships (Impett & Peplau, 2003; Peplau, 2003).

The second critical difference between male and female sexual self-schemas regards the 'negative' (Embarrassed/Conservative) factor identified in the female schema construct, which relates to anxiety and embarrassment surrounding sexual issues and subsequent behavioural inhibition. Anderson et al. (1999) reported that similarities existed between the items on the Embarrassed/Conservative factor of the female sexual self-

schema and more general measures of anxiety, specifically the neuroticism construct identified by Eysenck in his three factor model of personality. They argued that this was consistent with Eysenck's finding that women high in neuroticism were less sexually experienced, a finding that was not observed for men high in trait neuroticism (Anderson et al., 1999). The presence of an anxiety-related dimension of sexuality in the female construct is also supported in findings relating to broader assessment of personality, wherein women tend to be higher in traits related to anxiety and neuroticism than men (Aluja, Garcia, & Garcia, 2002; Ball, 1995; Costa Jr, Terracciano, & McCrae, 2001; Goma-i-Freixanet, Valero, Punti, & Zuckerman, 2004; Goma-i-Freixanet, Wismeijer, & Valero, 2005; Zuckerman & Kuhlman, 1998, 2000; Zuckerman et al., 1993). It is not unexpected, then, that a dimension relating to sexual-specific anxiety was found for females and not males in their sexual self-concept.

Based on the finding that male and female sexual self-schemas relate to sexual experience and activity in general (Anderson & Cyranowski, 1994; Anderson et al., 1999; Cyranowski & Anderson, 1998), it is also possible that sexual self schemas relate to sexual risk-taking more specifically. As observed in the case of sensation-seeking – where both the general and also sexual-specific manifestation of this trait have been studied in relation to sexual risk-taking – specific aspects of personality that relate to sexual behaviour and contexts can also be examined. The sexual self-schema has not yet been examined in drug using populations, or in relation to substance related sexual risk-taking. Given the established differences between males and females in terms of their sexual-self schema, it is possible that sexual-specific anxiety may play a role in ecstasy related sexual risk-taking for females.

5.3 The 'Personality' of Ecstasy Users

To date only a limited number of studies have examined the association between personality variables and ecstasy use. The relationship between impulsivity and ecstasy use has received most of the research focus so far. This is perhaps due to the fact that behaviours characterised by impaired impulse regulation have been found to be associated with depressed serotonin functioning, which research suggests is a functional consequence of ecstasy use in humans (Butler & Montgomery, 2004). Indeed the research findings support this association: elevated levels of impulsivity have been consistently associated with ecstasy use via self-report (Butler & Montgomery, 2004; Morgan, 1998; Parrott et al.,

2000) and are also evident in behavioural measures of impulsivity (Butler & Montgomery, 2004; Morgan, 1998).

In the first published research to examine the personality profile of ecstasy users, Morgan (1998) sought to determine whether a history of recreational ecstasy use was associated with impulsivity. In the two studies conducted by Morgan (1998) addressing this issue, three study groups were defined according to their drug use history. The first was a group of recreational ecstasy users who also used other drugs; the second, a group of polydrug using controls who had no exposure to ecstasy use; and the third, a non-drug using control group who had never used illicit drugs. There were no significant differences across the three groups of participants with respect to age, gender ratio, education and estimated pre-morbid intelligence in either of the studies. The measure of personality employed by Morgan (1998) was the Impulsiveness, Venturesomeness and Empathy scale (IVE) questionnaire, wherein elevated levels of impulsivity reflect a tendency to enter into risky behaviours without consideration of the consequences. Morgan (1998) observed in both studies that those individuals with a history of ecstasy use exhibited significantly higher trait impulsivity scores in comparison to both the non-drug using controls, but also importantly in comparison to the poly-drug using controls. Subsequent research that has examined scores on the IVE as a function of ecstasy use supported these initial findings of Morgan (1998), also documenting that ecstasy users are typically more impulsive than non-ecstasy users (Butler & Montgomery, 2004; Parrott et al., 2000). To further strengthen the findings relating to self-report measures of impulsivity, Morgan also administered a behavioural test of impulsivity – the Matching Familiar Figures Test (MFF20) – to the participants in his studies. Administration of the MFF20 involves the simultaneous presentation of a stimulus figure and six alternative figures, where participants are required to identify the one figure out of the six alternatives that matches the stimulus. The results of the MFF20 in both studies support the findings arising from the self-report measure of impulsivity. Specifically, participants with a history of recreational ecstasy use committed a significantly larger proportion of 'errors' in this test, than participants in either of the control groups reflecting higher levels of impulsivity.

Studies that have employed Cloninger's tri-dimensional personality questionnaire (TPQ) have also been able to differentiate between ecstasy users and non users according to personality (Butler & Montgomery, 2004; Dughiero et al., 2001; Morgan, 1998; Schifano, 2000). The TPQ assesses three facets of personality: novelty-seeking, which is conceptually similar to sensation-seeking; harm-avoidance; and reward-dependence. In the three studies

that have compared ecstasy users to non-drug users and polydrug using controls on these dimensions of personality, no statistical differences have been observed between scores on harm-avoidance or reward-dependence but all three studies reported that ecstasy users are characterised by high levels of novelty-seeking when compared to control groups (Butler & Montgomery, 2004; Dughiero et al., 2001; Schifano, 2000). In addition to the self-report measure of novelty-seeking, Butler & Montgomery (2004) also provided a behavioural measure of the risk-taking component of impulsivity by including a financial 'risk-taking' task. Compared to groups of non-drug using controls, cannabis only users and light ecstasy users, a group of 'high' ecstasy users made significantly more risky choices in this task. The findings in this study, when considered in addition to those that examined impulsivity, indicate that in general ecstasy use is associated with personality domains relating to higher levels of impulsivity and risk-taking (Butler & Montgomery, 2004).

In a contrasting set of results to those described above, Scoda (2002) administered the Arnett Inventory of Sensation-Seeking (AISS; comprised of novelty and intensity subscales) to a sample including both individuals who reported a history of ecstasy use and those who had never tried ecstasy. When comparing ecstasy users and nonusers according to their scores on the AISS, the results counter-intuitively indicated that as individuals' scores on the novelty and intensity scales increased, the less likely they were to have used ecstasy. Scoda (2002) however cautioned that these findings needed to be interpreted with caution given that they run counter to a large literature that associates sensation-seeking traits with an increased likelihood of involvement in drug and alcohol use, as well as a number of studies that have specifically documented a positive relationship between increased sensation-seeking traits and ecstasy use (Butler & Montgomery, 2004; Dughiero et al., 2001; Schifano, 2000).

In addition to the AISS results above, Scoda (2002) also administered Costa and McCrae's Five-Factor Model of personality to her sample. Scoda's (2002) study is now one of two that have explored the personality profile of ecstasy users from a taxonomic perspective, with ter Bogt, Engels and Dubas (2006) more recently examining differences with respect to ecstasy use on a Dutch adaptation of Goldberg's 'Big Five' personality assessment (Scoda, 2002; ter Bogt, Engels, & Dubas, 2006). A different set of findings emerged from each of these studies. In Scoda's research, ecstasy users were differentiated from non users only according to their scores on the Openness to Experience Scale, wherein ecstasy users scored higher on a scale reflecting a tendency towards increased flexibility, curiosity and open-mindedness than non-users. ter Bogt et al. (2006) however

did not observe any differences between ecstasy users and non-users according to the Openness to Experience dimension on the 'Big Five'. The key finding of their research was that after controlling for the effects of age, gender and education, ecstasy use was associated with elevated levels of extraversion and lower levels of conscientiousness (ter Bogt et al., 2006).

5.4 Summary of Personality Research

Despite the presence of at times inconsistent findings, the study of personality variables related to sensation-seeking and impulsivity domains in particular imply a positive association between these aspects of personality and increased engagement in risky sexual activity overall. Some have provided explanations for conflicting findings in the study of personality and sexual risk-taking by focussing largely on methodological issues, namely the differences in definitions of core aspects of personality as well as the use of varying assessment tools when measuring personality traits. However, the primary concern underpinning the major review of personality and sexual risk-taking conducted by Hoyle et al. (2000) was that almost all of the studies that examined personality and sexual risk-taking focussed solely on sensation-seeking. Specifically, they identified that almost two-thirds of the 53 studies reviewed in this meta-analysis examined sensation-seeking exclusive of other personality variables.

Personality characteristics have been consistently linked to substance use, however research on the association between personality and MDMA use is relatively scarce. The limited research available that has examined the link between personality and MDMA use shows that ecstasy users are in general characterised by elevated levels of impulsivity (Butler & Montgomery, 2004; Morgan, 1998; Parrott et al., 2000) and a propensity towards sensation or novelty-seeking (Butler & Montgomery, 2004; Dughiero et al., 2001) when compared with non-ecstasy users and polydrug using controls. As observed in the broader literature examining personality in relation to various aspects of risk-taking, the majority of the research examining the 'personality' of ecstasy users has also tended to focus on those dimensions of personality related to impulsive and sensation or risk-seeking aspects.

Although sound theoretical arguments have implied a link between neuroticism and sexual risk-taking, the findings of the research that have examined the relationship so far are on the whole less decisive. Strong support for the role of neuroticism in predicting sexual risk-taking behaviour was observed in the one study to date that has considered all

five aspects of personality specified within Zuckerman and Kuhlman's model using an all female sample (Ball & Schottenfeld, 1997). This research demonstrates the importance of considering dimensions of personality other than those related to impulsivity and sensation-seeking domains when examining sexual risk-taking.

The review of personality research presented in this chapter also included a consideration of those aspects of personality which relate to sexuality specifically – the sexual self-schema. In spite of the obvious ties between this aspect of personality and sexual behaviour generally, sexual self-schema has received relatively little attention in the literature on sexual risk-taking behaviour. The presence of an anxiety-related aspect of sexuality for females, in addition to the finding that anxious personality traits best predict risky sex among female cocaine abusers (Ball & Schottenfeld, 1997), raise the possibility that, for females, sexual-specific anxiety may play a role in understanding sexual risk-taking behaviour.

5.5 Aims of the Current Study

The research indicates that the study of personality variables in relation to sexual risk-taking promotes an enhanced understanding of the complex factors underlying this behaviour. The identification of the aspects of personality posing barriers to the implementation of safer sex practices for a target population has implications for health campaigns designed to benefit that population (Caspi et al., 1997; Pinkerton & Abramson, 1995).

Although they are often treated as competing explanations, there is research demonstrating that causal and third variable theories are not incompatible with each other in attempts to understand sexual risk-taking (for example Kalichman & Cain, 2004; Kalichman et al., 1998). Some theorists have posited that the relationship between outcome expectancies and alcohol and other drug use may be particularly pertinent in those individuals seeking a 'passport' (MacAndrew & Edgerton, 1969) for their sexual behaviours, such as those who are anxious regarding sex. In relation to alcohol, Leigh (1990) hypothesised that the pairing of elevated anxiety levels relating to sexual issues with a set of strong beliefs regarding the potential for alcohol use to result in sexual disinhibition, may provide motivation for drinking in social or sexual situations. To date, there is no known research that has attempted to examine the impact of personality traits

outside of those in the impulsive sensation-seeking domain on sexual risk-taking behaviour among regular ecstasy users.

With these findings in mind, the study reported in this chapter sought to examine the relationship between ecstasy outcome expectancies, personality variables and ecstasy related sexual behaviour. The previous chapter reported a study that examined whether the beliefs people hold regarding the effects of ecstasy on their sexual functioning and behaviour were associated with ecstasy related sexual risk-taking. The first aim of the current study was to confirm the findings observed in the previous study – that sex-related ecstasy outcome expectancies independently predict unsafe sexual behaviours related to ecstasy use. A second aim of the study was to explore the personality profile of a group of regular ecstasy users using a comprehensive biologically informed model of personality and examine whether features of this personality profile independently predict risky sexual behaviours related to ecstasy use. Personality traits can be examined at both a broader level and at a sexual specific level as conceptualised in the sexual self-schema construct. Based on the presence of an anxiety related dimension of sexuality unique to females, this study also examines for the first time whether sex specific anxiety is related to risky sexual behaviours under the influence of ecstasy for female regular ecstasy users. The final aim was to examine which personality and outcome expectancy variables could predict risky sexual behaviour under the influence of ecstasy, when both sets of variables are entered simultaneously into a logistic regression model. In Chapter Four the results indicated that both level of ecstasy use and ecstasy outcome expectancies were able to predict sexual risk-taking. This study sought to answer whether these variables are still able to predict involvement in sexual risk-taking behaviour, once any influence of personality has been adjusted for.

5.6 Method

5.6.1 Participants

A total of 126 individuals volunteered to participate in the study. The sample was predominantly male (67%). The age of participants ranged from 18 to 57, with a mean age of 22 years (SD = 4.9). All participants had used ecstasy at least monthly (i.e. six times) in the previous six months.

5.6.2 Procedure

The sample in the current study was comprised of regular ecstasy users who were interviewed in Canberra, Australia, between April and June 2005 as part of the EDRS

project. A full description of the EDRS along with the candidate's role in the design of the studies reported in this thesis are provided in the previous chapter.

Regular ecstasy users recruited as participants for the 2005 EDRS in the ACT were also administered supplementary questionnaires for the purposes of the current study. Participants were recruited for the study by using the same purposive sampling strategy (Kerlinger, 1986) employed in the previous study. The 'snowball' sampling technique, a recruitment strategy commonly used when researching groups such as ecstasy users that are hard to reach, was also utilised for the purposes of this study. Once individuals had completed the EDRS interview and additional questionnaires, they were then asked if they would be willing to discuss the study with friends who would be interested in participating. Those participants who agreed were given a bundle of flyers that listed the contact details for the study.

Individuals who were interested in participating in the study contacted the researchers by telephone or email. Entry criteria for the current study were: the use of ecstasy on at least six occasions in the preceding six months (i.e. at least monthly use in the past six months); to have been a resident of Canberra for a minimum of the past 12 months; and to be at least 18 years of age. The study was approved by the ANU Human Research Ethics Committee (HREC).

The interviews were conducted by the candidate and by other interviewers trained in administration of the interview schedule. Interviews took place most commonly in locations such as cafes, university campuses, bars, and parks. Before commencing the interview, participants were required to read a study information form. The nature and purpose of the study was also explained by the interviewer prior to obtaining the informed consent of the participant. On completion of the interview, participants were provided with AUD $30 as reimbursement for their time and travel expenses.

5.6.3 Measures

As in the 2004 EDRS, participants were administered a structured interview based on a national study of ecstasy use conducted by NDARC in 1997 and subsequent studies conducted in NSW, QLD and SA. The full results of the 2005 ACT EDRS studies are reported elsewhere (Proudfoot, Ward, Staniforth, & Buckingham, 2006) and the variables of interest for this study are described later. Data were collected on demographic information and patterns of ecstasy and other drug use, with a focus on patterns of use in

the six months prior to interview. For each drug listed below participants were asked whether they had ever used the drug, whether they had used the drug in the past six months, how often they had used the drug in the past six months, how they had administered the drug (swallowing, snorting, smoking, injecting) in their lifetime and specifically in the past six months, and what amount had they used of the drugs in a 'typical' and the 'heaviest' episodes of use: alcohol; cannabis; tobacco; methamphetamine (powder, base, crystal and pharmaceutical stimulants asked about separately); cocaine; LSD; mushrooms; MDA; ketamine; GHB; 1,4B; GBL; amyl nitrate; nitrous oxide; benzodiazepines; anti-depressants; heroin; methadone; buprenorphine; and other opiates. In addition to the above questions participants were also asked in relation to their ecstasy use: the age at which they first tried ecstasy; the age at which they started to use ecstasy regularly (i.e. on a monthly basis); their preferred route of ecstasy administration in the past six months (swallowing, snorting, injecting, smoking, shelving/shafting); the form of ecstasy they had used most of in the past six months (pills, powder or capsules); whether they used drugs in combination with ecstasy (and if so, which drugs); and whether they used other drugs to facilitate their 'comedown' (also nominating which drugs were used with ecstasy in this context).

A series of questions relating to sexual risk behaviour in the past six months were also administered to participants as part of the EDRS schedule. Participants were asked: how many sexual partners they had in the past six months; the frequency of condom use for sex with 'regular' and 'casual' partners in the past six months; frequency of anal sex in the past six months; whether they had had sex under the influence of ecstasy and other drugs in the past six months (and if so, to estimate how often); which drugs they had had sex under the last time they identified doing so; and the frequency of condom use for sex under the influence of substance with 'regular' and 'casual' partners.

On completion of the structured interview, participants then responded to a seven page questionnaire for the purposes of the current study. This questionnaire consisted of the EEQ (Scoda, 2002) which is described in the previous study (see Appendix A.1); specific questions relating to the sexual practices of participants involving ecstasy that were also administered in the first study (presented in Appendix A.2); the Sexual Self-Schema Scale which has separate female (Anderson & Cyranowski, 1994) and male (Anderson et al., 1999) versions; and also the Zuckerman-Kuhlman Personality Questionnaire (ZKPQ) (Zuckerman et al., 1993).

Sexual Self-Schema Scales (Anderson & Cyranowski, 1994; Anderson et al., 1999)

The Sexual Self-Schema Scale provides a measure of an individuals' cognitive representation of themselves as a 'sexual being', with separate forms used to measure male (presented in Appendix B.1) and female (presented in Appendix B.2) sexual self-schemas. The Sexual Self-Schema Scale requires participants to rate themselves according to a series of adjectives on a seven point Likert scale ranging from zero ('Not at all descriptive of me') to six ('Very much descriptive of me'). On the male form participants respond to a list of 45 adjectives and on the female form to a list of 50 adjectives. In each of the forms a number of sexually relevant adjectives are placed in among a list of 'filler' adjectives; a total of 27 adjectives in the male form, 26 in the female form, are retained in order to calculate sexual self-schema scores. The measure is considered to be covert because the instructions do not ask the respondent to rate the adjectives in terms of their sexuality and even the sexually relevant items do not contain any sexual content. The Sexual Self-Schema questionnaire therefore addresses response biases that apply to sexually explicit measures of sexual self-concept.

The conceptualisation of the male sexual self-schema consists of three factors, all of which relate to positive dimensions of sexuality: Factor One: Passionate/Loving; Factor Two: Powerful/Aggressive; and Factor Three: Open-Minded/Liberal. The three factor scores are also summed to obtain a Total Sexual Self-Schema score (Full Scale). Males with high schema scores ('Schematics') contrast to males with low schema scores ('Aschematics'). In previous research, high internal consistencies (α) have been reported for the male Sexual Self-Schema measure (Full Scale = 86; Factor One: Passionate/Loving =.89; Factor Two: Powerful/Aggressive = .78; and Factor Three: Open-Minded/Liberal = .65) (Anderson et al., 1999). Test-retest reliability obtained for a nine week interval was also high (r = .81) reflecting the stability characteristic of this measure (Anderson et al., 1999). In this study the scores on the three component factors and also the Total Schema score were examined in relation to the sexual behaviour of males.

In the female form the response of participants to the adjectives are also divided into three factors. However, in comparison to male sexual self-schema, two of these factors represent positive aspects of sexual self-schema (Factor One: Passionate/Romantic and Factor Two: Open/Direct) and the third represents a negative aspect which is believed to deter female sexual expression (Factor Three: Embarrassed/Conservative). To obtain the total sexual self-schema score for females, the 'Negative Factor' score is subtracted from the sum of Factors One (Passionate/Romantic) and Two (Open/Direct) which forms the

'Positive Factor' scores. In previous research high internal consistency scores have been observed for the Total Sexual Self-Schema score (α = .82), with strong two (r = .89) and nine (r = .88) week test-retest reliabilities also having been reported (Anderson & Cyranowski, 1994). In addition, high internal consistency scores (α) for the three factors have also been reported (Factor One: Passionate/Romantic = .81; Factor Two: Open/Direct = .77; Factor Three: Embarrassed/Conservative = .66) (Anderson & Cyranowski, 1994). For the purposes of the present study, scores on the three component factors for females were examined in relationship to recent sexual behaviour.

Zuckerman Kuhlman Personality Questionnaire (Zuckerman et al., 1993)

The ZKPQ is a self-report questionnaire consisting of 99 true-false items (presented in Appendix B.3). The ZKPQ measures five personality traits: impulsive sensation-seeking; neuroticism-anxiety; aggression-hostility; activity and sociability. In addition to the five personality factors assessed which are described below, the ZKPQ also includes an infrequency scale (10 items) which is used to eliminate subjects with possible invalid records. The development of this measure of personality was based on the initial factor analysis of 33 scales believed to measure basic dimensions of temperament (Zuckerman, Kuhlman, Thornquist, & Kiers, 1991) and in the final stage of development, the scales were based on item factor analyses (Zuckerman et al., 1993).

The impulsive sensation-seeking scale includes 19 items which describe both the tendency to act impulsively without prior planning (e.g. 'I often get so carried away by new and exciting things and ideas that I never think of possible complications'), and a desire for activities that provide excitement and thrills (e.g. 'I like doing things just for the thrill of it'). The neuroticism-anxiety scale also includes 19 items that relate to the general experience of negative emotional states such as a tendency towards anxiety, tension, indecisiveness, lack of self-confidence and a sensitivity to criticism (e.g. 'I often worry about things that that other people think are unimportant'). Of the 17 items included in the aggression-hostility scale, half reflect a readiness to express verbal aggression and hostility (e.g. 'I can't help being a little rude to people I do not like') whereas the other half characterise a general predisposition towards anger manifest in antisocial behaviour, vengefulness and spitefulness (e.g. 'I have a very strong temper' and 'When people shout at me, I shout back'). The activity (17 items) scale is characterised by a general need for high levels of activity coupled with impatience and restlessness when there is nothing to do (e.g. 'I like to be active as soon as I wake up in the morning) and a specific preference for challenging work and activities that require high energy levels (e.g. 'I like complicated jobs that require

a lot of effort and concentration). The final scale, sociability (17 items), involves a liking of big parties, having many friends and continual social interactions (e.g. 'I often find myself being the 'life of the party') and also an intolerance for social isolation in highly sociable subjects (e.g. 'I would rather 'hang out' with friends rather than work on something by myself').

In the fifteen years since its first publication, the ZKPQ has undergone comprehensive psychometric testing examining its reliability and validity factors. The internal reliability findings for the five scales are robust. For example, in a normative sample of almost 3000 American college students, the alpha (α) scores established for all five ZKPQ scales ranged from .76 to .84 for females and .74 to .82 for males (Zuckerman & Kuhlman, 1998). Sound psychometrics have also been reported for the ZKPQ when administered in contrasting populations such as college students (Zuckerman, 2002; Zuckerman & Kuhlman, 1998), cocaine abusers (Ball, 1995; Ball & Schottenfeld, 1997) and prostitutes (O'Sullivan, Zuckerman, & Kraft, 1996). Published findings relating to convergence and discriminant validity statistics are also strong for the ZKPQ (see Zuckerman (2002) for a review). Support for the cross-cultural generality of the personality constructs assessed by the ZKPQ is evidenced in the solid factor reliabilities and internal scale reliabilities of translated versions of the scale such as in Spanish (Aluja et al., 2002), Chinese (Wang, Du, Wang, Livesley, & Jang, 2004), and Catalan (Goma-i-Freixanet et al., 2004). In addition to established strong psychometric properties of the ZKPQ, this measure of personality was chosen for the purposes of the current study because it does not contain items that make reference to alcohol use, drug use, or sexual behaviour.

5.6.4 Data Analysis

Correlational analyses employed Pearson's correlation coefficient and Spearman's correlation coefficient where the assumptions for parametric tests were not met. For dichotomous variables, the Pearson's chi-square (χ^2) test was used to assess for statistical differences between groups. T-tests were employed to compare differences between groups on continuous variables other than where the variables were highly skewed, where medians were reported and the Mann-Whitney *U* test employed. Binary variables were created to indicate whether each respondent had or had not in the past six months engaged in: sex under the influence of ecstasy (the last time they had sex under the influence of party drugs); unsafe sex under the influence of ecstasy; or unintended sex under the influence of ecstasy. Logistic regression analyses were conducted to assess if outcome expectancies and personality variables were independently related to the sexual risk variables. Then multiple

logistic regression analysis were employed to examine the relationship between sexual risk-taking and the variables that were identified of importance in the earlier analyses, including the frequency of ecstasy use (past six months), ecstasy outcome expectancies as measured by the EEQ and personality variables as measured by the ZKPQ. Each logistic regression model was reduced by employing the backward elimination procedure recommended by Kleinbaum et al. (1988) as described in Chapter Four. All analyses were conducted using SPSS for Windows. A two-tailed alpha criterion of 0.05 was employed for all statistical tests.

5.7 Results

The results of this study will be presented in five sections. The first section describes the demographic characteristics and patterns of ecstasy and other drug use for this sample. In the subsequent sections, the response of participants to the EEQ, the ZKPQ and the Sexual Self-Schema questionnaire are presented. Due to inherent differences in the measurement of female and male sexual self-schema, the relationship between sexual self-schema and risky sexual behaviour is examined separately for females and males. The fourth section first describes the sexual behaviour of this sample within the previous six months. The findings that relate to a series of analyses conducted to ascertain whether ecstasy outcome expectancies and personality variables relate to sexual behaviour related to ecstasy use are then discussed. In the fifth and final section, the results of logistic regression analyses that identify the predictors of ecstasy related sexual risk-taking in this sample of regular ecstasy users are presented.

5.7.1 Sample Characteristics

The majority of participants indicated that they were heterosexual (81%), almost all participants (94%) reported that English was the predominant language they spoke at home, and only a minority (2%) of the sample identified as Aboriginal or Torres Strait Islander (ATSI). The sample generally reported high levels of education, with 87% of the sample having completed high school and almost one half (45%) of the sample studying on a full-time basis at the time of interview. Approximately one third (29%) of the sample indicated that they were currently employed on a fulltime basis, seventeen percent of the sample was employed on a casual or part time basis, and a minority (8%) were currently unemployed. Only one participant reported that they were enrolled in some form of drug treatment at the time of interview and a minority (3%) of the sample had ever been imprisoned. In terms of their relationship status, the majority (64%) of the sample reported

that they were single at the time of interview. Approximately one third (31%) of the sample reported they were currently involved with a 'regular partner', and small proportions also identified being married or in a defacto relationship (3%), separated (1%) or divorced (1%).

Consistent with findings observed in the previous chapter and the existing literature (Black et al., 2008; Breen et al., 2004; Butler & Montgomery, 2004; Dunn et al., 2007; Lenton et al., 1997; Parrott et al., 2001; Schifano et al., 1998; Solowij et al., 1992; Stafford et al., 2005; Stafford et al., 2006; Strote et al., 2002; Topp, Hando, & Dillon, 1999; Topp, Hando, Dillon et al., 1999), poly drug use was characteristic of this sample. Participants reported a mean of nine (*SD* = 2.92, *Range* 2 - 16) drugs ever having been used in their lifetime, and a mean of six (*SD* = 2.02, *Range* 1 - 13) drugs having been used in the preceding six months.

Over half the sample (53%) nominated ecstasy as their drug of choice. The mean age at which participants reported first having tried ecstasy was 19 years (*SD* = 3.27, *Range* 13 - 40), and the mean age at which users reported first having used ecstasy on a regular basis (defined as at least monthly use) was 20 years (*SD* = 3.86, *Range* 15 - 47). Respondents had used ecstasy on a median of 13 days in the six months prior to interview (*Range* 6 - 110). In the preceding six months the most common pattern of ecstasy use was on a fortnightly to monthly basis (49%), followed by approximately one third (32%) of participants having typically used ecstasy on a weekly to fortnightly basis, and 19% indicating that they had used ecstasy on more than one day per week during this period. When employing the cut-offs utilised in the previous study to define the frequency of ecstasy use for the current sample, 34% of the current sample were identified as 'light' users and 66% of the sample were classified as 'heavy' users.

In addition to the frequency of ecstasy use over the past six months, the quantity of ecstasy used in 'typical' and 'biggest' episodes of use was also assessed. The median number of ecstasy tablets taken by participants in a 'typical' episode of use was two (*Range* 0.5 – 7.0). Seventy one percent of the sample reported that they typically used more than one tablet in a standard episode of use. When asked about the quantity of use in their 'heaviest' episode of use in the preceding six months, the median number of tablets consumed increased to three (*Range* 1 – 18). Almost half (48%) the sample reported having taken four or more ecstasy tablets in a single use episode in the preceding six months.

Consistent with findings reported in the previous study, ecstasy had also been used during extended 'binge' episodes of drug use (defined as having used the substance without sleep for 48 hours or more) by one-third (33%) of the sample. The median length of the longest reported binge session on ecstasy in the preceding six months was three days (i.e. 72 hours). Other substances typically consumed with ecstasy during these binge episodes were methamphetamine powder (61%), cannabis (39%), alcohol (35%), cocaine (20%) and methamphetamine base (20%). In addition to the use of other substances with ecstasy during binge episodes, almost the entire (91%) sample indicated that it was common practice to use other substances in combination with ecstasy in standard use episodes. Similarly, almost three quarters (73%) of the sample indicated that they typically used other substances to facilitate the 'comedown' from ecstasy. The substances most commonly used in conjunction with and to 'comedown' from ecstasy were alcohol, cannabis and tobacco.

When examining the routes of ecstasy administration in this sample, all (100%) participants reported swallowing ecstasy in the six months prior to interview, with a large proportion (79%) also reporting having snorted the drug, and smaller proportions reporting shelving/shafting (10%), smoking (6%) and the injection (2%) of ecstasy. Almost all (96%) participants nominated oral ingestion as their 'main' route of administration of ecstasy in the past six months, with 3% of the sample reporting they mainly snorted the drug, and one participant primarily injecting ecstasy in the past six months.

5.7.2 Ecstasy Outcome Expectancies

The EEQ subscale means obtained in this sample were all within one standard deviation of the mean scores for ecstasy users in the Scoda (2002) study on which the EEQ was developed and also for the sample of regular ecstasy users employed in the previous study. The internal consistency of the eight EEQ scales as measured by coefficient alpha (α) for each of the scales was Sociability = .80, Manic Mood State = .59, Increased Coping = .77, Sexual Decrement = .77, Sexual Enhancement = .81, Negative Mood State = .79, Cognitive Decrement = .68 and Tension Reduction = .71. Also consistent with the results of the first study, positive intercorrelations were observed among the three subscales that measure positive outcomes expectancies (Sociability, Increased Coping and Tension Reduction subscales) and positive intercorrelations were observed among the three subscales which measure negative expectancies (Cognitive Decrement, Sexual Decrement and Negative Mood State).

A series of statistical tests were conducted to examine potential differences in ecstasy outcome expectancies according to demographic variables of potential importance: age; sex; and sexual orientation (heterosexual and non-heterosexual participants). There were no significant differences for ecstasy outcome expectancies as measured by the EEQ subscale means according to age, sex or sexual orientation in this sample. Additionally, consistent with findings established in previous research (Engels & ter Bogt, 2004; Scoda, 2002) and also those documented in the previous study, ecstasy users were not reliably differentiated in terms of their outcome expectancies regarding the effects of ecstasy according to the frequency ('light' versus 'heavy') of their recent use.

5.7.3 Personality

5.7.3.1 Zuckerman Kuhlman Personality Questionnaire (ZKPQ)

Adequate internal consistency scores (α) were obtained for the five ZKPQ personality subscales: activity = .71; aggression-hostility = .72; sociability = .77; impulsive sensation-seeking = .78 and neuroticism-anxiety = .87. Table 5.1 presents the intercorrelations observed between the ZKPQ personality scales in three independent studies, including the sample of ecstasy users obtained in the present study, the sample of American College students on whom the ZKPQ was developed (Zuckerman et al., 1993) and a sample of cocaine abusers seeking outpatient treatment (Ball, 1995). In general the strength of correlations between scales in this study were similar to those obtained in the college student sample (see Table 5.1) and none of the intercorrelations among the scales exceeded .27, which was similar to the maximum intercorrelation (.28) obtained in the college sample (Zuckerman et al., 1993). In the sample of regular ecstasy users, sociability was positively correlated with aggression-hostility (.27), impulsive sensation-seeking (.24) and activity (.22). As was observed in the sample of cocaine abusers, for the sample of ecstasy users Neuroticism-Anxiety was positively correlated with the personality measure of Aggression-Hostility (.27). Although the positive intercorrelation between neuroticism-anxiety and aggression-hostility was also observed in the college sample, the strength of that correlation was not as strong as in the two drug using populations. In contrast to findings observed for the samples of cocaine abusers and college students, impulsive sensation-seeking did not correlate with aggression-hostility for ecstasy users (see Table 5.1).

Table 5.1

Intercorrelations Among ZKPQ Personality Variables in Three Samples

Subscale	Aggression -Hostility	Sociability	Impulsive Sensation-Seeking	Neuroticism -Anxiety
Activity				
Ecstasy users [a]	-.001	.22*	.14	.06
College [b]	.05	.13**	.15**	-.02
Cocaine [c]	.01	.25***	.13**	-.03
Aggression-Hostility				
Ecstasy users	–	.27**	.05	.27**
College	–	.11**	.25**	.11**
Cocaine	–	-.06	.43***	.33***
Sociability				
Ecstasy users		–	.24**	.06
College		–	.28**	-.14**
Cocaine		–	-.03	-.22***
Impulsive Sensation-Seeking				
Ecstasy users			–	.14
College			–	-.09
Cocaine			–	.52***

[a] Current sample of regular ecstasy users, $N = 126$

[b] Zuckerman et al. (1993), $N = 589$

[c] Ball (1995), $N = 450$

*$p < .05$, **$p < .01$, ***$p < .001$

Table 5.2 presents the means and standards deviations for each of the ZKPQ scales in the three study populations described above. With the exception of the impulsive sensation-seeking scale, all of the ZKPQ subscale scores obtained for this sample of ecstasy users were within one *SD* of the mean scores obtained in both cocaine using and college student samples. The present sample of ecstasy users scored higher (more than one *SD*) on the measure of impulsive sensation-seeking than the college student sample and also, interestingly, in comparison to the sample of cocaine abusers.

Table 5.2

Means and Standard Deviations for ZKPQ Personality Variables in Three Samples

Subscale	Ecstasy Users		College Sample		Cocaine Abusers	
	M	*SD*	*M*	*SD*	*M*	*SD*
Activity	8.07	3.33	7.30	4.10	8.60	3.90
Aggression-Hostility	7.91	3.37	9.10	4.60	8.60	5.10
Sociability	11.03	3.55	8.00	4.10	11.10	3.40
Impulsive Sensation-Seeking	13.41	3.60	9.50	4.40	9.40	4.40
Neuroticism-Anxiety	7.45	4.88	12.50	4.00	10.40	4.30

[a] Current sample of regular ecstasy users, $N = 126$

[b] Zuckerman et al. (1993), $N = 589$

[c] Ball (1995), $N = 450$

$*p < .05$, $**p < .01$, $***p < .001$

A series of t-tests were also conducted for the study to assess whether any differences existed on the ZKPQ personality domains according to sex and the frequency of ecstasy use. As shown in Table 5.3, scores on the neuroticism-anxiety scale were higher for females ($M = 9.13$, $SD = 4.95$) than males ($M = 6.61$, $SD = 4.64$, $t(118) = 2.73$, $p<.01$), a finding that has been consistently reported in personality research (Aluja et al., 2002; Ball, 1995; Costa Jr et al., 2001; Goma-i-Freixanet et al., 2004; Goma-i-Freixanet et al., 2005; Zuckerman & Kuhlman, 1998, 2000; Zuckerman et al., 1993). In contrast to an established pattern of results wherein males tend to score higher than females on measures of impulsivity (Aluja et al., 2002; Goma-i-Freixanet et al., 2004; Zuckerman & Kuhlman, 2000; Zuckerman et al., 1993), there was no difference observed between males ($M = 9.13$, $SD = 4.95$) and females ($M = 9.13$, $SD = 4.95$) on the measure of impulsive-sensation seeking ($t(119) = -.89$, $p = .38$) in this sample. No significant differences were observed between males and females for measures of sociability ($t(116) = 1.00$, $p = .32$), aggression-hostility ($t(123) = .43$, $p = .67$), or Activity ($t(120) = -.62$, $p = .54$).

Table 5.3

Means and Standard Deviations for ZKPQ Personality Variables According to Sex

Subscale	Males $n = 85$		Females $n = 41$	
	M	*SD*	*M*	*SD*
Activity	8.19	3.18	7.79	3.65
Aggression-Hostility	7.82	3.39	8.10	3.34
Sociability	10.80	3.51	11.50	3.62
Impulsive Sensation-Seeking	13.62	3.69	13.00	3.44
Neuroticism-Anxiety	6.61	4.64	9.13**	4.95

*$p < .05$, **$p < .01$, ***$p < .001$

Analyses were also conducted to examine if differences existed in the personality domains as a function of frequency of ecstasy use. The results indicated that 'light' and 'heavy' ecstasy users differed according to scores on two of the five ZKPQ personality scales. Specifically, there was a significant difference between 'light' ($M = 10.05$, $SD = 3.63$) and 'heavy' ecstasy users ($M = 11.55$, $SD = 3.41$) on the sociability subscale, with heavier users scoring significantly higher on this measure than lighter users ($t(116) = -2.22, p < .05$). 'Heavy' ecstasy users ($M = 13.87$, $SD = 3.32$) also scored significantly higher than 'light' users ($M = 12.55$, $SD = 3.98$) on the personality measure of impulsive sensation-seeking ($t(119) = -1.95, p < .05$). No significant differences were found between 'light' and 'heavy' users according to their scores on measures of neuroticism-anxiety ($t(118) = -.15, p = .15$), aggression-hostility ($t(123) = -.74, p = .46$) or activity ($t(120) = -.67, p = .50$).

5.7.3.2 Sexual Self-Schema: Males

The internal consistencies (α) for the three male factor scores in this sample were: Factor One (Passionate/Loving) = .87; Factor Two (Powerful/Aggressive) = .69; and Factor Three (Open Minded/Liberal) = .62. The Cronbach's alpha for the Positive Factor (Factors One and Two combined) was .59. The obtained alpha for the Total Schema score for males was .83. Table 5.4 presents the intercorrelations between the factors for this sample of male ecstasy users. The intercorrelation data demonstrate the strong relationship between each of the three factors and the Total Schema score, with the correlations ranging from .63 to .82.

Table 5.4 also presents the means and standard deviations for the male Sexual Self-Schema factor scores. The mean Total Schema score for males in this sample was 109.73 (SD = 15.41) which is similar to the score obtained in the original development study of the male questionnaire (Anderson et al., 1999). The mean scores for the three factors were: Factor 1 (Passionate/Loving) = 43.27 (SD = 8.26); Factor 2 (Powerful/Aggressive) = 48.13 (SD = 8.21); and Factor 3 (Open Minded/Liberal) = 18.48 (SD = 3.79).

Table 5.4

Means and Standard Deviations of Male Sexual Self-Schema Scores and Factor and Total Score Intercorrelations

			Intercorrelations		
Scale	*M*	*SD*	Factor 1	Factor 2	Factor 3
Factor One:					
Passionate/Loving	43.27	8.26	–		
Factor Two:					
Powerful/Aggressive	48.13	8.21	.32**	–	
Factor Three:					
Open-Minded Liberal	18.48	3.79	.47***	.21	–
Total	109.73	15.41	.82***	.76***	.63***

*$p < .05$, **$p < .01$, ***$p < .001$

In order to examine relationships that may exist between the sexual specific aspects of personality and more general personality dispositions, scores on the five ZKPQ personality scales were correlated with the three component Factor scales and also the Total Schema scale for males. A number of significant positive correlations were observed between scores on the Sexual Self-Schema questionnaire and the personality domains assessed by the ZKPQ. Firstly, the Total Score for males correlated positively with both the impulsive sensation-seeking and activity subscales of the ZKPQ. Males with a more 'positive' sexual self-schema were more likely to be high on impulsive sensation-seeking (r = .23, $p < .05$), as well as on activity (r = .24, $p < .05$). Significant positive correlations were also observed between scores on Factor 2 (Powerful/Aggressive) of the Sexual Self-Schema Scale and aggression-hostility, activity and sociability as measured by the ZKPQ. Specifically, males who viewed themselves as sexually powerful and aggressive were also more likely to readily express verbal aggression and hostility (r = .36, $p < .01$), have a

stronger need for high levels of activity in their lives ($r = .27, p < .05$) and seek out social interactions ($r = .23, p < .05$).

5.7.3.3 Sexual Self-Schemas: Female

Moderate internal consistencies (α) for the three female factor scores were observed in this sample: Factor One (Passionate/Romantic) = .57; Factor Two (Open/Direct) = .71; Factor Three (Embarrassed/Conservative) = .62. The Cronbach's alpha for the Positive Factor (Factors One and Two combined) was .69, with the Negative Factor also demonstrating adequate internal consistency for research (.62). The obtained alpha for the Total Schema score for females in this sample was however poor (.47) – the Total Schema score was therefore not utilised in subsequent analyses that explored potential differences in sexual self-concept and sexual behaviour. Table 5.5 presents the intercorrelations between the Sexual Self Schema factors for this sample of female ecstasy users. The intercorrelations between each factor and the Total score range from .61 to .81, and demonstrate the strong relationship of each factor to the Total score. These patterns of findings are expected and are consistent with those reported in Anderson and Cyranowski's (1994) study which developed the Female Sexual Self-Schema Scale. Furthermore, the expected negative relationships between the Factor One and Factor Three (-.11), and Factor Two and Factor Three (-.49) were also observed.

Table 5.5

Means and Standard Deviations of Female Sexual Self-Schema Scores and Factor and Total Score Intercorrelations

			Intercorrelations		
Scale	*M*	*SD*	Factor 1	Factor 2	Factor 3
Factor One:					
Passionate/Loving	44.05	5.56	–		
Factor Two:					
Open/Direct	39.45	6.34	.22	–	
Factor Three:					
Embarrassed/Conservative	16.82	5.72	-.11	-.49**	–
Total	66.92	12.74	.61***	.81***	-.72***

*$p < .05$, **$p < .01$, ***$p < .001$

Table 5.5 also presents the means and standard deviations for the female Sexual Self-Schema factor scores. The mean Total Schema score for females in this sample was 66.92 (SD = 12.74). This score is also comparable to the Total Schema scores obtained for female samples in earlier research (Anderson & Cyranowski, 1994; Cyranowski & Anderson, 1998). The mean scores for the two positive factors were 44.05 (SD = 5.56) for Factor One (Passionate/Romantic), and 39.45 (SD = 6.34) for Factor Two (Open-Direct). The mean for the Positive Factor (the sum of Factors One and Two) was 83.50 (SD = 9.29). The mean score for the Negative Factor (Factor Three) was 16.82 (SD = 5.72). For the purposes of this study, scores on the positive and negative dimensions of female sexual self-schema were considered separately.

As was the case for males, scores on the five ZKPQ personality scales were also correlated with the Sexual Self-Schema subscales and the Positive and Negative dimensions of the Sexual Self-Schema for females. A significant negative correlation was observed between neuroticism-anxiety as measured by the ZKPQ and scores on the Open-Direct factor of the Sexual Self-Schema. Consistent with theoretical expectation, females who scored higher on trait levels of neuroticism were less likely to endorse items that they are sexually direct and open (r = -.44, p < .005). Contrary to prediction however there was not a significant correlation observed between the broad measure of neuroticism (ZKPQ neuroticism-anxiety) and the Negative dimension on the female Sexual Self-Schema scale (r = .27, p = .11). No other significant relationships were observed between the ZKPQ and Sexual Self-Schema variables for females.

Based on the finding that males and females who significantly differ in terms of their sexual self-schema also differ in terms of their sexual behaviour (Anderson & Cyranowski, 1994; Anderson et al., 1999; Cyranowski & Anderson, 1998), analyses were conducted to examine whether the number of sexual partners ecstasy users in this study reported having in the previous six months differed according to sexual self-schema scores. Consistent with the finding that males who are sexually 'schematic' have a higher frequency of sexual relationships than sexually 'aschematic' males (Anderson et al., 1999), a significant and positive relationship was observed between the Total Schema score and the number of sexual partners in the previous six months (r = .26, p < .05). Similarly, a significant correlation was observed between increasing scores on the Powerful/Aggressive factor of sexuality unique to males and the number of sexual partners in the past six months. For females however, there were no significant correlations observed between the number of

reported sexual partners in the preceding six months and any of the component measures of sexual self-schema.

5.7.4 The Sexual Behaviour of Ecstasy Users

5.7.4.1 General Patterns in Recent Sexual Behaviour

Table 5.6 presents data on the sexual practices of this sample in the preceding six months. Almost the entire sample (93%) reported having penetrative sex in the past six months where penetrative sex was defined as 'penetration by penis or fist of the vagina or anus'. Of this group, almost three quarters (72%) reported having multiple (two or more) sexual partners during this period of time. The majority (86%) of sexually active participants reported having sex with a 'regular' partner in the preceding six months and almost three quarters (74%) reporting having sex with a 'casual' partner. Approximately one in four (24%) reported anal sex (see Table 5.6).

Among those who had sex with a regular partner in the past six months, approximately one third (36%) used condoms on every occasion, with the remaining 64% reporting inconsistent condom use. Among those who had sex with a casual partner in the preceding six months, over half (70%) reported always using condoms, with almost one third (30%) reporting inconsistent condom use. The pattern of less consistent condom use with regular, as opposed to casual, partners has also been observed in the previous study and other published research (de Visser et al., 2003c; Van de Ven et al., 2002; Van de Ven et al., 2004). Overall, the frequency of anal sex was relatively low, with 'monthly or less than monthly' frequency being the most common pattern in the past six months (75%), followed by weekly or less (11%) and a minority (7%) reporting anal sex on a fortnightly or less frequency (see Table 5.6).

Table 5.6

Sexual Behaviour of 126 Regular Ecstasy Users

	Total (%)
Penetrative sex in past six months	93
Number of sexual partners past six months [a]	
One partner	28
Two partners	21
3-5 partners	41
6-10 partners	9
10+ partners	1
Had sex with a regular partner [a]	86
Always used condoms	36
Inconsistent condom use	64
Had sex with a casual partner [a]	74
Always used condoms	70
Inconsistent condom use	30
Anal sex [a]	24
Monthly or less	75
Fortnightly or less	7
Weekly or less	11
More than weekly	7

[a] Of those who were sexually active in the past six months, $n = 117$

Seventy six percent of sexually active participants reported having had sex under the influence of ecstasy or other party drugs in the past six months (Table 5.7). Around one third (34%) of these respondents indicated that they had had sex under the influence of drugs on at least a monthly basis in the past six months, with a similar proportion reporting they had done so between three and five times in the previous six months. The drugs that participants reported most commonly having sex under the influence of the last time they had sex under the influence were: ecstasy (98%); cannabis (35%); alcohol (32%); methamphetamine powder (21%) and cocaine (18%).

Similar proportions of participants who reported having sex under the influence of ecstasy and other party drugs had done so with regular (60%) and casual (55%) partners. Among those who had sex with a regular partner while using ecstasy or other party drugs in

the preceding six months (see Table 5.7), 68% reported that they used condoms inconsistently with their regular partner while only one third (32%) used condoms every time. Among those who had sex with a casual partner while using ecstasy and related drugs in the past six months (Table 5.7), 65% reported always using condoms and just over one third (35%) reported inconsistent condom use. Consistent with earlier findings, the rates of condom use with both regular and casual partners remained relatively consistent across sexual encounters whether drugs were involved or not. However, significant proportions of the sample had still engaged in unsafe sex with both regular and casual sexual partners over the past six months, which warrants concern.

Table 5.7

Sexual Behaviour Under the Influence of Ecstasy and Related Drugs

	Total (%)
Had sex under the influence of ecstasy or party drugs [a]	76
Number of times	
Once	11
Twice	24
3-5 times	31
6-10 times	13
More than 10 times	21
Had sex with a regular partner under the influence [a]	60
Used condoms every time	32
Inconsistent condom use	68
Had sex with a casual partner under the influence [a]	55
Used condoms every time	65
Inconsistent condom use	35
Had unsafe sex under the influence of ecstasy	39
Had unintended sex under the influence of ecstasy	23

[a] Of those who were sexually active in the past six months, $n = 116$ (one case of missing data)

As explained in the Method, participants also responded to questions that directly assessed whether they had recently had unsafe or unintended sex under the influence of ecstasy. Over one third (39%) of sexually active participants reported having unsafe sex (i.e. sex without a condom) under the influence of ecstasy in the past six months.

Approximately one quarter (24%) of participants reported having unintended sex under the influence of drugs, and the majority (93%) of these participants reported having done so under the influence of ecstasy (23% of sexually active participants; see Table 5.7). Significant proportions of participants also reported having unintended sex under the influence of cannabis (47%), alcohol (43%), and methamphetamine powder ('speed') (37%).

5.7.4.2 The Relationship Between Ecstasy Outcome Expectancies, Personality and Risky Sexual Behaviour Under The Influence of Ecstasy

In the first study, positive outcome expectancies relating to the effects of ecstasy on sexual behaviour were found to predict risky sexual behaviours that occurred whilst under the influence of ecstasy. The analyses presented in this section first aim to replicate this finding. Then a series of analyses were conducted to examine whether personality traits are related to sexual risk-taking behaviour among ecstasy users. On the basis of these preliminary results, multiple logistic regression analyses were then conducted to investigate which of the relevant variables would remain significant in predicting the ecstasy-related sex risk behaviours examined when all of the significant predictors were entered into a multivariate model together. All plausible interactions were assessed prior to model construction.

First, a series of statistical tests were conducted to ascertain whether differences existed between those who had engaged in each of the three forms of sexual risk-taking in the past six months (having sex under the influence of ecstasy, having unsafe and unintended sex under the influence of ecstasy) according to demographic variables. There were no differences based on sex, age or sexual orientation between individuals who had engaged in any form of ecstasy-related sexual risk-taking and those who had not. However, significant differences did exist on the sexual risk-taking measures according to frequency of an individual's recent ecstasy use, with heavy users more likely to have engaged in all forms of ecstasy related sexual risk-taking. Specifically, eighty two percent of 'heavy' ecstasy users reported having sex under the influence of ecstasy in the past six months, a significantly higher proportion than 42% of 'light' ecstasy users who had done so (*OR* = 6.30, *95% CI*: 2.76 – 14.36). Similarly, almost half (47%) those respondents who used ecstasy on a fortnightly or greater than fortnightly basis ('heavy use') reported having unsafe sex under the influence of ecstasy in the previous six months. This was significantly higher than the 23% of 'lighter' ecstasy users who reported having done so (*OR* = 2.92, *95% CI*: 1.27 – 6.70). Finally, a greater proportion of 'heavy' (32%) ecstasy users had had

unintended sex under the influence of ecstasy in the past six months than was the case for 'light' (5%) ecstasy users (*OR* = 9.69, *95% CI*: 2.18 – 43.17).

Outcome Expectancies and Ecstasy Related Sexual Risk-Taking

Preliminary t-tests were performed on the eight ecstasy outcome expectancy scales to assess whether significant differences existed between those who had engaged in each of the three forms of sexual risk-taking examined and those who had not. As can be seen in Table 5.8, there were significant differences between participants who reported having sex under the influence of ecstasy and those who did not for three of the EEQ subscales: Sexual Decrement, Sexual Enhancement and Manic Mood State. These findings indicated that those participants who reported having sex under the influence of ecstasy in the past six months scored significantly higher than those who had on both the Sexual Enhancement ($t(122) = -3.98, p < .001$) and Manic Mood State subscales of the EEQ ($t(123) = -2.10, p < .05$). Conversely, individuals who had unsafe sex under the influence of ecstasy scored significantly lower than those who did not on the Sexual Decrement subscale ($t(120) = 2.85, p < .01$).

Table 5.8

Means and Standard Deviations for EEQ Subscales According Sex Under the Influence of Ecstasy

	Sex under influence of ecstasy $n = 48$		No sex under influence of ecstasy $n = 76$	
	M	*SD*	*M*	*SD*
Sociability	33.85	5.72	33.85	5.44
Manic Mood State	17.01	4.59	15.15*	4.73
Increased Coping	16.62	6.02	18.20	5.14
Sexual Decrement	9.78	5.32	12.81**	5.64
Sexual Enhancement	13.53	4.46	10.26**	3.62
Negative Mood	11.42	5.42	11.30	6.65
Cognitive Decrement	17.60	4.53	15.93	5.74
Tension Reduction	20.54	4.16	20.65	4.07

*$p < .05$, **$p < .01$

The results presented in Table 5.9 indicate that participants who reported having unsafe sex under the influence of ecstasy differed compared to those who had not on two of the EEQ subscales: Sexual Decrement and Sexual Enhancement. Specifically, participants who had not had unsafe sex under the influence of ecstasy scored significantly higher than those who had on the Sexual Decrement scale of the EEQ ($t(118) = 2.29, p < .05$). Conversely, participants who reported having unsafe sex under the influence of ecstasy scored significantly higher than those who did not on the Sexual Enhancement subscale ($t(120) = -2.74, p < .01$).

Table 5.9

Means and Standard Deviations for EEQ Subscales According to Unsafe Sex Under the Influence of Ecstasy

	Unsafe sex under influence of ecstasy $n = 48$		No unsafe sex under influence of ecstasy $n = 76$	
	M	*SD*	*M*	*SD*
Sociability	34.60	5.52	33.40	5.72
Manic Mood State	16.79	4.24	16.17	5.01
Increased Coping	17.04	6.23	17.01	5.45
Sexual Decrement	9.25	5.30	11.60*	5.65
Sexual Enhancement	13.81	4.69	11.62**	4.06
Negative Mood	10.64	4.62	11.80	6.48
Cognitive Decrement	17.44	5.11	16.83	4.97
Tension Reduction	20.98	3.95	20.25	4.21

*$p < .05$, **$p < .01$

Similarly, when examining differences between participants who had unintended sex under the influence of ecstasy in the past six months and those who did not, sexual risk-takers scored significantly higher than non risk-takers on both the Sexual Enhancement ($t(120) = -3.25, p < .01$) and Manic Mood ($t(121) = -2.24, p < .05$) subscales (Table 5.10).

Table 5.10

Means and Standard Deviations for EEQ Subscales According to Unintended Sex Under the Influence of Ecstasy

	Unintended sex under influence of ecstasy $n = 28$		No unintended sex under influence of ecstasy $n = 96$	
	M	*SD*	*M*	*SD*
Sociability	33.79	6.40	33.89	5.45
Manic Mood State	18.14	4.42	15.91*	4.70
Increased Coping	16.50	6.81	17.18	5.42
Sexual Decrement	11.43	5.71	10.42	5.59
Sexual Enhancement	14.79	4.42	11.80**	4.22
Negative Mood	11.46	6.25	11.33	5.76
Cognitive Decrement	18.00	4.96	16.79	5.02
Tension Reduction	21.14	4.57	20.36	3.97

*$p < .05$, **$p < .01$

Personality Variables as Predictors of Ecstasy Related Sexual Risk-Taking

A series of t-tests were performed to assess which of the five ZKPQ personality scales would best predict ecstasy related sexual risk-taking. A significant difference was observed between participants who had sex under the influence of ecstasy in the past six months and those who did not for two of the five ZKPQ scales: aggression-hostility ($t(123) = -2.19, p < .05$) and sociability ($t(116) = -2.83, p < .01$), with those who engaged in this behaviour scoring significantly higher on both of these personality domains (Table 5.11).

Table 5.11

Means and Standard Deviations for ZKPQ Variables According to Sex Under the Influence of Ecstasy

	Sex under influence of ecstasy $n = 48$		No sex under influence of ecstasy $n = 76$	
	M	*SD*	*M*	*SD*
Activity	8.21	3.35	7.73	3.29
Aggression-Hostility	8.35	3.09	6.95*	3.77
Sociability	11.61	3.52	9.63**	3.25
Impulsive Sensation-Seeking	13.78	3.43	12.64	3.89
Neuroticism-Anxiety	7.89	4.84	6.58	4.89

*$p < .05$, **$p < .01$

As shown in Table 5.12, participants who reported having unsafe sex under the influence of ecstasy again scored significantly higher on the measure of aggression-hostility ($t(121) = -2.09, p < .05$), and also on the neuroticism-anxiety subscale ($t(116) = -2.18, p < .05$).

Table 5.12

Means and Standard Deviations for ZKPQ Variables According to Unsafe Sex Under the Influence of Ecstasy

	Unsafe sex under influence of ecstasy $n = 48$		No unsafe sex under influence of ecstasy $n = 76$	
	M	*SD*	*M*	*SD*
Activity	8.17	3.26	7.92	3.38
Aggression-Hostility	8.64	2.88	7.36*	3.54
Sociability	11.47	3.78	10.69	3.39
Impulsive Sensation-Seeking	13.47	3.31	13.32	3.82
Neuroticism-Anxiety	8.73	5.00	6.73*	4.70

*$p < .05$, **$p < .01$

As can be seen in Table 5.13 there were significant differences between participants who reported having unintended sex under the influence of ecstasy and those who did not again for neuroticism-anxiety ($t(116) = -2.77, p < .01$), and also for sociability ($t(114) = -2.52, p < .05$).

Table 5.13

Means and Standard Deviations for ZKPQ Variables According to Unintended Sex Under the Influence of Ecstasy

	Unintended sex under influence of ecstasy $n = 28$		No unintended sex under influence of ecstasy $n = 96$	
	M	*SD*	*M*	*SD*
Activity	8.39	3.21	7.90	3.36
Aggression-Hostility	8.50	3.83	7.65	3.33
Sociability	12.50	2.98	10.56*	3.59
Impulsive Sensation-Seeking	14.60	2.92	13.05	3.73
Neuroticism-Anxiety	9.88	5.20	6.86**	4.63

*$p < .05$, **$p < .01$

In addition to examining the relationship between broad aspects of personality and sexual risk-taking, this study also specifically examined the relationship between sexual risk-taking and those aspects of personality relating to sexual identity, as measured by the Sexual Self-Schema questionnaire (Anderson & Cyranowski, 1994; Anderson et al., 1999). Initially, a series of t-tests were performed separately for males and females in order to determine if differences existed between sexual risk-takers and non risk-takers according to the sexual self-schema factors.

For males, there were no differences observed between sexual risk-takers and non-risk takers on the Total Schema score. However, scores on the Powerful/Aggressive dimension of the male sexual self-schema significantly differed for two of the three risk variables studied. Specifically, there was a significant difference between men who had unsafe sex under the influence of ecstasy ($M = 50.83$, $SD = 7.65$) and those who had not ($M = 46.86$, $SD = 8.00$), with risk-takers scoring significantly higher on this measure than

non risk-takers ($t(79) = -2.19, p < .05$). Similarly males who reported having unintended sex under the influence of ecstasy ($M = 52.50$, $SD = 7.92$) also scored significantly higher on this measure than males who had not had unintended sex under the influence ($M = 47.31$, $SD = 7.81$; $t(79) = -2.38, p < .05$).

For females, no differences were observed on any of the sexual self-schema factor scores (Factor One: Passionate/Romantic; Factor Two: Open/Direct; Factor Three (Negative) Embarrassed/Conservative; and the Positive Factor) between those who reported having sex under the influence of ecstasy, or unsafe sex under the influence of ecstasy in the previous six months. Females who reported having had unintended sex under the influence of ecstasy did however differ from those who had not according to their score on the Embarrassed/Conservative factor, which represents the negative or anxiety related dimension of female sexuality. These findings, however, were observed in the opposite direction to the original hypothesis, with females who had engaged in unintended sex under the influence of ecstasy ($M = 12.22$, $SD = 3.11$) scoring lower on the measure of sexual embarrassment and conservatism, than females who had not engaged in this behaviour ($M = 18.24$, $SD = 5.62$; $t(36) = 3.05, p < .01$).

Due to the small sample sizes available in this study to examine the relationship between sexual self-schema and sexual risk-taking for males ($n = 85$) and females ($n = 41$), it was not appropriate to conduct logistic regression analyses to determine if these variables independently predicted sexual risk-taking. The sexual self-schema data was therefore not included in the final logistic regression models that follow.

5.7.5 The Predictors of Ecstasy Related Risky Sexual Behaviour

The next stage of the analysis compared the utility of the predictors and determined which variables (when entered simultaneously into a logistic regression model) significantly predicted risky sexual behaviours related to ecstasy use. In the first step, the eight EEQ subscales were correlated with each of the five ZKPQ personality variables in order to determine if interaction variables needed to be considered in the analyses. No significant correlations were observed between the EEQ subscales and any of the five ZKPQ personality scales.

On the basis of the earlier analyses, the full model specified to predict sex under the influence of ecstasy in the past six months included six variables: three of the EEQ subscales (Sexual Enhancement, Sexual Decrement and Manic Mood); two of the ZKPQ

scales (sociability and aggression-hostility); and the binary measure of frequency of ecstasy use in the past six months ('light' or 'heavy'). As seen in Table 5.14, three predictors emerged as significant in the final model of sex under the influence of ecstasy – the EEQ Sexual Enhancement subscale, the ZKPQ sociability scale and the frequency of ecstasy use (χ^2 (3, N = 116) = 37.62, p < .001). Specifically, 'heavy' ecstasy users were more likely than 'light' users to have had sex while under the influence of ecstasy in the past six months and those participants who endorsed a stronger belief in the sexual enhancement effects of ecstasy were also more likely to have had sex under the influence of ecstasy. Additionally, as individuals' scores on the sociability subscale increased, so too did the chances of having engaged in sex under the influence of ecstasy (Table 5.14).

Table 5.14

Final Logistic Regression Model for the Predictors of Sex Under the Influence of Ecstasy

Variable	*B*	*SE*	*p*	*OR (95% CI)*
EEQ Sexual Enhancement	.23	.07	.00	1.26 (1.09 - 1.44)
ZKPQ Sociability	.16	.08	.03	1.17 (1.01 - 1.36)
'Light' v 'Heavy' Ecstasy Use	1.98	.51	.00	7.24 (2.66 - 19.73)
χ^2 (3, N = 116) = 37.62, p < .001				

When constructing the logistic regression model to examine unsafe sex under the influence of ecstasy, the full model specified included five variables that had emerged significant in preliminary analyses: the EEQ Sexual Enhancement and Sexual Decrement subscales, the ZKPQ neuroticism-anxiety and aggression-hostility scales, and the frequency of ecstasy use. Two of these variables emerged as significant after the backward elimination procedure was employed. These results confirm the findings of the previous study, which indicate that both the frequency of ecstasy use and ecstasy outcome expectancies predict the likelihood of engaging in unsafe sex under the influence of ecstasy. As can be seen in Table 5.15, 'heavy' ecstasy users were more likely than 'light' users to have had unsafe sex while under the influence of ecstasy in the past six months. In addition, scores on the Sexual Enhancement subscale also positively predicted unsafe sex under the influence of ecstasy (χ^2 (2, N = 122) = 12.47, p < .01; see Table 5.15). Specifically, those participants who endorsed a stronger belief in the sexual enhancement effects of ecstasy were more likely to have had ecstasy related unsafe sex.

Table 5.15

Final Logistic Regression Model for the Predictors of Unsafe Sex Under the Influence of Ecstasy

Variable	*B*	*SE*	*p*	*OR (95% CI)*
EEQ Sexual Enhancement	.11	.05	.02	1.11 (1.02 - 1.21)
'Light' v 'Heavy' Ecstasy Use	.95	.43	.03	2.60 (1.11 -6.08)
χ^2 (2, N = 122) = 12.47, p < .01				

In the final logistic regression analysis, five variables were entered into the model to determine the predictors of unintended sex under the influence of ecstasy: the EEQ Sexual Enhancement and Manic Mood subscales, the ZKPQ sociability and neuroticism-anxiety subscales; and the frequency of ecstasy use. Again using backward elimination procedure, the final predictors that remained significant in the model were the EEQ Sexual Enhancement subscale, the ZKPQ neuroticism-anxiety subscale and the frequency of ecstasy use (see Table 5.16; χ^2 (3, N = 116) = 23.32, p<.0001; see Table 5.16).

Table 5.16

Final Logistic Regression Model for the Predictors of Unintended Sex Under the Influence of Ecstasy

Variable	*B*	*SE*	*p*	*OR (95% CI)*
EEQ Sexual Enhancement	.14	.06	.02	1.15 (1.02 - 1.28)
ZKPQ Neuroticism-Anxiety	.11	.05	.04	1.11 (1.00 - 1.23)
'Light' v 'Heavy' Ecstasy Use	1.88	.79	.02	6.54 (1.38 – 30.85)
χ^2 (3, N = 116) = 23.32, p < .0001				

Repeating the patterns of earlier findings reported, those participants who endorsed a stronger belief in the sexual enhancement effects of ecstasy were also more likely to have had unintended sex in the past six months and 'heavy' ecstasy users were more likely than 'light' users to have had unintended sex under ecstasy in the past six months. In addition, those individuals who scored higher on neuroticism-anxiety were also more likely to have had unintended sex under the influence of ecstasy.

5.8 Discussion

5.8.1 Overview and Summary of Findings

This study examined the relationship between ecstasy outcome expectancies, personality and ecstasy related 'risky' sexual behaviours in a sample of young adults who regularly use ecstasy in the ACT, Australia. Consistent with the previous study, the level of sexual risk-taking observed among this sample in the preceding six months was high. The majority of participants reported having engaged in numerous sexual behaviours that place them at significant risk for the consequences of unsafe sexual behaviour. In the first key finding of this study, the results reported in the previous chapter were replicated, providing further evidence for the relationship between ecstasy outcome expectancies and risky sexual behaviours related to ecstasy use. Specifically this study demonstrated that participants who expected sexual disinhibition to result from ecstasy use were more likely to have recently engaged in ecstasy-related sexual encounters, including unsafe and unintended sexual encounters. In the second key finding, this study found that personality variables were also shown to predict risky sexual behaviours among a group of regular ecstasy users. The results that analysed the independent relationship between outcome expectancies and personality variables with sexual risk-taking were considered when arriving at the final regression models constructed to best predict three forms of ecstasy-related sexual risk-taking. Importantly, in addition to the frequency of ecstasy use, both outcome expectancies (EEQ Sexual Enhancement subscale) and personality variables (sociability and neuroticism-anxiety scales) were shown to significantly contribute to the prediction of different forms of ecstasy related sexual risk-taking in these analyses.

5.8.2 Sexual Risk-Taking Behaviour

Sexual risk behaviours that place the individual at increased risk of contracting STIs (such as sex with multiple partners, casual sex, unsafe sex and sex under the influence of substances) were prevalent among this sample of young adult regular ecstasy users. The majority (93%) of the current sample were sexually active in the previous six months and the majority (72%) also reported having sex with multiple sexual partners in this timeframe, thus placing them at increased risk for the negative consequences of unsafe sexual behaviour. Sixty four percent of individuals who had sex with a 'regular' partner failed to use condoms at least once in the past six months and 30% who had sex with a 'casual' partner also reported inconsistent condom use during this timeframe. Given that the majority of participants in this study reported having sex with two or more partners, the rates of infrequent condom use reported for sex with both 'regular' and 'casual' partners in

this study again warrants concern. Additionally, the majority of participants also reported recently having sex under the influence of ecstasy and other drugs – 60% did so with a 'regular' sex partner, and over half (55%) reported having done so with a 'casual' sex partner in the past six months. As observed in the previous study, the rates of condom use in the present sample remained relatively stable across sexual encounters with 'casual' partners whether intoxicated on ecstasy and not. In contrast to the previous study, however, rates of condom use also remained relatively stable across sexual encounters with 'regular' partners when intoxicated on ecstasy and not.

5.8.3 Frequency of Ecstasy Use, Outcome Expectancies and Ecstasy-Related Sexual Risk-Taking

As in Chapter Four, this study examined the relationship between ecstasy use, ecstasy outcome expectancies and ecstasy-related sexual risk taking behaviour. The results of this study provide further evidence supporting an association between ecstasy use and unsafe sexual behaviour in a sample of young Australian adults who predominantly identify as heterosexual. Thirty nine percent of sexually active participants reported having unsafe sex under the influence of ecstasy in the past six months, and almost one in four (23%) participants reported having unintended sex under the influence of ecstasy. Consistent with the findings in the previous study and other research (Theall et al., 2006), this study demonstrated the importance of considering the frequency of ecstasy use when predicting ecstasy-related unsafe sex. Participants who used ecstasy on a fortnightly or more basis in the past six months ('Heavy' users) were approximately seven times more likely to have had sex under the influence of ecstasy, almost three times more likely to have had sex without using a condom under the influence of ecstasy, and six times more likely to have had unintended sex under the influence of ecstasy than those users who reported using ecstasy on a less regular basis ('Light' users).

However the results of this study indicated that the frequency of ecstasy use is not the only variable that needs to be considered when understanding ecstasy related sexual risk-taking. Specifically, individuals' beliefs relating to the effects of ecstasy were once again shown to play a significant role in understanding sexual behaviour related to ecstasy use. Consistent with the results observed in Chapter Four, a key finding of this study was that individuals who held stronger expectations that ecstasy would disinhibit them sexually were more likely to report having been involved in ecstasy-related sexual risk-taking. That is, the Sexual Enhancement subscale of the EEQ was found to reliably predict having sex under the influence of ecstasy, having unsafe sex under the influence of ecstasy and having

unintended sex under the influence of ecstasy. When considered collectively, the findings of the current and the previous study suggest that those expectancies that relate to specific effects of ecstasy on sexual behaviour – in particular positive or enhancement effects – are particularly important in predicting ecstasy-related sexual risk-taking. These results strengthen the support for the theory that changes in the sexual behaviour of humans that result from ecstasy use can be interpreted, in part, as being associated with the outcomes humans expect to experience from consuming ecstasy.

5.8.4 Personality Variables and Ecstasy-Related Sexual Risk-Taking

In accordance with the small amount of literature examining the personality of ecstasy users available so far (Butler & Montgomery, 2004; Dughiero et al., 2001; Morgan, 1998; Parrott et al., 2000), this study also found that ecstasy users were characterised by elevated levels of impulsivity and a tendency towards sensation-seeking (impulsive sensation-seeking). Importantly and contrary to what was hypothesised, the impulsive sensation-seeking trait as measured in Zuckerman and Kuhlman's five factor model of personality was not associated with any of the forms of ecstasy-related sexual risk-taking assessed in this study. Two of the five personality dimensions assessed predicted the sexual risk-taking variables examined in this study. Specifically, having a preference for lots of friends and continual social interactions (ZKPQ sociability) was a significant predictor of having sex under the influence of ecstasy, and was also independently associated with having unintended sex under the influence of ecstasy. Higher levels of anxiety and neuroticism were also shown to be related to two of the sex risk variables, namely unsafe and unintended sex under the influence of ecstasy (ZKPQ neuroticism-anxiety). This finding in particular supports previous suggestions that in samples of 'high-risk' individuals, typically those defined by increased levels of impulsivity and sensation-seeking, those individuals who display higher levels of negative emotionality (neurotic or anxious traits) are at increased risk for involvement in sexual behaviours that place them at risk for sexual transmission of HIV and other infections (Ball & Schottenfeld, 1997; McCown, 1991; Trobst et al., 2002; Trobst et al., 2000). Given that sociability and neuroticism-anxiety personality traits were found to relate to different risk-taking behaviours, the results of this study are also consistent with conclusions drawn from Hoyle et al.'s (2000) review of sexual risk-taking literature, wherein different aspects of personality are found to relate to different forms of sexual risk-taking behaviour.

In addition to exploring the influence of personality traits on sexual risk-taking behaviour, the current study also examined the relationship between sexual-specific

personality domains (as assessed by the Sexual Self-Schema Scale) and 'risky' sex. Consistent with evidence that men who are more 'sexually schematic' tend to be more sexually experienced (Anderson et al., 1999), this study found that males who held more positive sexual self-schemas had more sexual partners in the previous six months. For females however, no association was observed between sexual behaviour in general (i.e. number of sexual partners in the past) and any dimension of the female Sexual Self-Schema Scale. When examining the relationship between sexual self-schema and sexual risk-taking, no relationship was observed between the Total Sexual Self-Schema score and any measure of sexual risk-taking behaviour for males. In a finding that directly opposed original hypotheses, this study also found that females who engaged in unintended sex under the influence of ecstasy, were less sexually anxious than those who did not. This suggests that women who are less sexually anxious might be more susceptible to sexual disinhibition than those who are more sexually anxious. While the Sexual Self-Schema Scale performs as in other populations for men in predicting number of sexual partners, it did not predict sexual risk-taking behaviour for males in this sample. Whereas, for females in this sample, this scale was not correlated with the number of sexual partners, but it did relate to sexual disinhibition although in a fashion contrary to what was hypothesised. Given the limitations in the size of the sample, further research might profitably examine whether these findings can be replicated in other samples of ecstasy users. Larger sample sizes would allow for multivariate analyses so that the role of, for example, sexual anxiety in females could be assessed to see if it continued to predict sexual disinhibition over and above other predictors of this variable.

5.8.5 Outcome Expectancies, Personality and Ecstasy-Related Sexual Behaviour

When examining outcome expectancies and the personality variables together, the final models suggested that both positive outcome expectancies and personality variables as well as frequency of ecstasy use contribute to the prediction of ecstasy-related unsafe sex. Specifically, the present study found that individuals who scored higher on sociability, the EEQ subscale of Sexual Enhancement, and who used ecstasy more regularly were more likely to have had sex under the influence of ecstasy in the past six months. When examining the predictors of unsafe sex related to ecstasy use, again those individuals higher on the EEQ Sexual Enhancement and who used ecstasy more regularly were more likely to have had unsafe sex under the influence of ecstasy in the past six months. Finally, individuals high on neuroticism-anxiety and EEQ Sexual Enhancement, and those using ecstasy more regularly, were more likely to have had unintended sex under the influence of ecstasy in the past six months.

The findings in this study can be interpreted in light of Cooper et al. (2000) who proposed that risky behaviours such as substance use and unsafe sex may result from one of two motivational pathways: 'enhancement motives', wherein an individual is involved in a particular behaviour in an attempt to pursue or enhance positive affect and feelings of well-being; and 'coping motives', where the individual is involved in a given behaviour in an attempt to avoid or escape from aversive emotional states. According to this framework, personality domains related to social extraversion or positive emotionality (such as the ZKPQ sociability scale) largely drive 'enhancement' motives whereas features of personality associated with negative emotionality (such as the ZKPQ neuroticism-anxiety scale) principally drive 'coping' motives.

In terms of the observed relationship between sociability and risky sexual behaviours in this sample, Miller et al. (2004) argued that the finding that individuals with higher levels of sociability are more likely to engage in risky sexual behaviours makes intuitive sense on one level, given that sex is intrinsically a social activity requiring a partner. Those individuals high on sociability therefore may appear more attractive to potential partners, thus making it easier to pursue opportunities for sexual relations based on characteristics such as assertiveness, confidence and social dominance that tend to correspond with this trait (Miller et al., 2004). In light of Cooper et al.'s (2000) motivational framework, individuals higher on sociability who also hold a stronger set of beliefs that ecstasy use leads to sexual disinhibition and/or enhancement may therefore be motivated to engage in sexual behaviour under the influence of substances due to the enhancement of positive feelings that this behaviour may provide. Similarly, Cooper et al.'s (2000) framework can also be applied in order to explain the relationship observed between neuroticism-anxiety and risky sexual behaviours in this finding and also other research. Namely, if an anxious individual holds a set of beliefs that ecstasy will disinhibit them sexually and the individual seeks this disinhibition, they may be more likely to use ecstasy in sexual situations to help them overcome the anxiety normally associated with such contexts. The results of the present study strengthen the assertion that changes in human sexual behaviour that result from ecstasy use can be interpreted in terms of the outcomes they expect to experience from consuming ecstasy and also highlight the importance of considering personality traits, as well as an individual's beliefs, in order to understand their motivation for involvement in unsafe sexual behaviours.

5.8.6 Limitations of the Current Study and Directions for Future Research

A number of limitations need to be considered when interpreting these findings. The 'snowball' sampling technique was again employed in this study to recruit the sample of regular ecstasy users obtained. Although the sample of ecstasy users recruited in the current study were comparable to typical 'ecstasy using' samples recruited previously both in Australia and from overseas (Black et al., 2008; Breen et al., 2004; Butler & Montgomery, 2004; Dunn et al., 2007; Lenton et al., 1997; Parrott et al., 2001; Schifano et al., 1998; Solowij et al., 1992; Stafford et al., 2005; Stafford et al., 2006; Strote et al., 2002; Topp, Hando, & Dillon, 1999; Topp, Hando, Dillon et al., 1999), caution should be exercised when attempting to generalise the findings from this study to the broader ecstasy using population. Given that the data obtained in this study is cross-sectional, causal inferences about the temporal sequence of personality variables and high-risk sex cannot be made. However given that a psychobiological measure of enduring personality traits was employed and sexual activity occurred within the previous six months, it is likely that those aspects of personality found to relate to sexual risk-taking predated the specific incidents of sexual risk taking examined, meaning that at least one of the requirements to establish causality (time-order) is likely to have been met.

The research reported in this chapter demonstrated both the independent and also joint contributions of outcome expectancies and personality traits in predicting ecstasy related sexual behaviours. The unique finding in this study was that increasing levels of trait anxiety, in combination with positive expectations regarding the effects of ecstasy on sexual domains, predicted unintended sexual encounters. Although this group of substance users appears to be defined by increased levels of impulsivity in general, the impulsive and sensation-seeking aspects of personality for this group of ecstasy users did not predict involvement in any of the ecstasy related 'risky' sexual behaviours assessed. This finding runs contrary to much of the literature reported to date, and will therefore be addressed in the following chapter. The next chapter of this thesis reports on the results of a study conducted to investigate whether the personality traits that predict sexual risk-taking behaviour differ between individuals who use ecstasy and those who don't.

CHAPTER SIX

Examining the Differential Predictors of Sexual Risk-Taking for Ecstasy Users and Non-Users

6.1 General Introduction

Impulsive sensation-seeking dimensions of personality are consistently associated with increased involvement in an extensive range of 'risk-taking' behaviours both in theory and in applied research. More specifically, impulsivity is considered not only a risk factor for the initiation of substance use but has also been established as a consequence of substance abuse (Moeller & Dougherty, 2002) and the relationship between sensation-seeking and substance use is also firmly established (Zuckerman, 1994a; Zuckerman & Kuhlman, 2000). Previous research indicates that substance users exhibit higher scores on self-report and (in some studies) behavioural measures of impulsivity and sensation-seeking compared with their non-substance using counterparts. With regard to the personality profile of ecstasy users in particular, the literature reviewed in the previous chapter is consistent with this (Butler & Montgomery, 2004; Dughiero et al., 2001; Moeller & Dougherty, 2002; Morgan, 1998; Parrott et al., 2000).

In addition to the documented association between ecstasy use and impulsive sensation-seeking personality traits, the research discussed in the previous chapter of this thesis also suggests that these personality traits are a reliable predictor of elevated levels of sexual risk-taking behaviour (Cooper et al., 2000; Hayaki et al., 2006; Hoyle et al., 2000; Schafer et al., 1994; Temple et al., 1993; Trobst et al., 2002; Trobst et al., 2000; Zuckerman & Kuhlman, 2000). Based on the available empirical support for the independent role of impulsivity and related domains in predicting both substance use and sexual risk-taking, it is understandable that some researchers have explored the hypothesis that these personality characteristics also account for the elevated occurrence of high-risk sex among substance users (e.g. Hayaki et al., 2006). However, the literature reviewed in Chapter Five also emphasises that the majority of research conducted to date has so far failed to consider the role that other dimensions of personality (outside of the impulsive and sensation-seeking domains) might play in understanding sexual risk-taking behaviour. In support of this assertion, the previous chapter reported on a number of published studies whose collective findings suggested that in samples traditionally considered 'high-risk' (i.e. those who

demonstrate elevated levels of impulsive sensation-seeking traits), individuals who display higher levels of trait anxiety are at increased risk of involvement in unsafe sexual behaviours (Ball & Schottenfeld, 1997; McCown, 1991; Trobst et al., 2002; Trobst et al., 2000). Additionally, the results obtained in the previous study of this dissertation further attest to the importance of considering a comprehensive model of personality when examining the personality predictors of sexual risk-taking behaviour among 'high-risk' samples. Although ecstasy users are a group that to date have been characterised by higher levels of impulsive sensation-seeking, the results reported in Chapter Five suggested that these aspects of personality were not related to ecstasy-related 'risky' sexual behaviours among regular users of the drug. Specifically, the central finding in the previous study was that, when combined in a statistical model with positive expectations regarding the effects of ecstasy on sexual domains, higher levels of trait anxiety and neuroticism were related to risky sexual encounters involving ecstasy and furthermore were able to predict unintended sexual encounters under the influence of ecstasy.

The study of personality variables in relation to sexual risk-taking to date has assisted in identifying those individuals who are more prone to involvement in risky sexual behaviour. Importantly, this research also indicates that differences may exist in terms of those aspects of personality that predict involvement in specific risk-taking behaviours (Hoyle et al., 2000). In addition, it suggests that different aspects of personality may relate to sexual risk-taking across contrasting populations. To explore this further, the next section examines research that has been conducted in an attempt to explain the relationship between trait anxiety and sexual risk-taking. This review is followed by a presentation of the aims for the current study.

6.2 Explanations for the Association Between Anxiety and Risky Sexual Behaviour

6.2.1 Neuroticism and Risk-Taking Behaviour

In an attempt to build on research that aims to identify which personality factors relate to various facets of sexual risk-taking, some researchers have focussed on exploring the potential mechanisms through which personality may relate to or influence risk-taking. One such mechanism attracting research in the sexual risk-taking literature has been the process of emotion regulation (Cooper et al., 2000; Cooper, Shapiro, & Powers, 1998). Cooper and colleagues (1998; 2000) proposed a motivational framework in which a range of risky behaviours, including drug use and sexual risk-taking, serve a number of psychological functions with a particular focus on the management of one's emotional life

or affective states. Central to Cooper et al.'s (2000) model is the understanding that individuals engage in risk-taking behaviours because these behaviours offer an immediate, affective gain. In turn, an individual may engage in a certain behaviour in an attempt to either increase or prolong the experience of positive or neutral affect (termed 'enhancement motives'), or to minimise or avoid the experience of negative affect (termed 'coping motives'). With respect to the demonstrated influence of personality on these motivational processes, Cooper et al. (2000) found that individuals high on extraversion were more likely to engage in problematic alcohol use and risky sex as a means of enhancing positive emotions, whereas individuals high on neuroticism engaged in these behaviours as a way of minimising negative feeling. Consistent with their predictions, Cooper et al. (2000) also reported that impulsivity not only influenced risky behaviour directly, but also by interacting with extraversion and neuroticism in predicting the contrasting motives for risk-taking. This finding is also congruent with recent research which demonstrates that personality profiles specifically involving both high levels of neuroticism and low levels of constraint (i.e. poor impulse control) are susceptible to involvement in risky health behaviours (Vollrath & Torgersen, 2002, 2008).

There is evidence which suggests that emotion regulation deficits give rise to the relationship between aversive mood states and subsequent engagement in risky behaviour (Auerbach, Abela, & Ringo Ho, 2007; Murray, Allen, & Trinder, 2002; Vollrath & Torgersen, 2000) and thus supports the proposed link between neuroticism and risky behaviour as put forward by Cooper et al. (2000). Research has shown, for example, that individuals who exhibit higher levels of neuroticism are in general more prone to experience aversive mood states. In an adult community based sample, elevated levels of neuroticism were found to predict not only increases in negative emotional states but also a decrease in the experience of positive mood states (Murray et al., 2002). Neuroticism has also been identified as the key personality factor determining vulnerability to stress and in addition, individuals high in neuroticism show deficits in ways of coping with and handling stress, such as risk-taking behaviour (Vollrath & Torgersen, 2000). In a recent set of findings that provide strong support for Cooper et al.'s (2000) theory, Auerbach et al. (2007) reported that university students high on trait levels of neuroticism and demonstrating emotion regulation deficits were significantly more likely than others to report increased engagement in a variety of risky behaviours, following the experience of depressive and anxious symptoms.

Consistent with the theory that dysphoric individuals engage in risk-taking as a means of managing their mood, the evidence suggests that alcohol and drug use also often result from attempts to relieve negative moods such as anxiety and depression (Carrigan & Randall, 2003; Cooper et al., 2000; Loukas et al., 2000; Vollrath & Torgersen, 2002, 2008). With respect to alcohol use for example, research has shown that individuals high in neuroticism place stronger emphasis on the use of alcohol to cope with negative emotional states (Loukas et al., 2000). Similar to the way that the use of substances may provide immediate and reinforcing short-term benefits in terms of an individual's mood state, some have proposed that sexual behaviours (irrespective of the level of risk associated with them) also bear the potential to provide a range of desired psychological outcomes (Cooper et al., 1998). With this in mind, drug use may be used to cope with negative affect, but it may also be a factor in using sex for this purpose. For example, in the same way that one anxious individual might use ecstasy to experience a euphoric mood state, another anxious individual may use ecstasy to disinhibit them sexually, and subsequently reduce their anxiety (temporarily) through a sexual encounter (Folkman, Chesney, Pollack, & Phillips, 1992).

In summary, the literature reviewed above suggests that attempts to regulate emotional experience, whether by enhancing a positive mood or avoiding an aversive one, provide pathways through which personality variables influence involvement in risk-taking behaviour. For neurotic individuals in particular, the goal of coping with or reducing anxiety and other negative mood states appears paramount. However, given the tendency of neurotic individuals to employ maladaptive behaviours such as risk-taking as a means of coping with the emotional state from which they wish to escape, their negative affective state is often maintained in the long-term (Auerbach et al., 2007; Cooper et al., 2000; Cooper et al., 1998; Murray et al., 2002; Vollrath & Torgersen, 2000, 2008).

6.2.2 Social Anxiety and Sexual Risk-Taking

As evidenced in Chapter Five, it has been shown that an individual's general disposition towards anxiety and neuroticism can contribute to involvement in sexual risk-taking behaviour. In addition to the differences observed across individuals with respect to their level of broad or general anxiety, it is also recognised that the experience of anxiety and other aversive emotional states also relates to specific contexts or situations that vary from person to person. In the previous chapter, a sexual specific form of anxiety (as measured by the sexual self-schema construct) was explored in relation to sexual risk-taking behaviour, with no reliable association found between these two variables.

Research has established that some individuals demonstrate susceptibility to anxiety particularly in social settings, and there is related research that examines the coping methods that socially anxious individuals develop as a means to manage their anxiety. For example, in relation to alcohol consumption there is evidence that problematic drinkers typically report elevated levels of social anxiety (Lewis & O'Neill, 2000; Loukas et al., 2000) and individuals who experience high levels of social anxiety use alcohol as a means of managing their apprehension in social contexts (Carrigan & Randall, 2003; Thomas, Randall, & Carrigan, 2003). Based on an identified facet of anxiety specific to social situations, and the failure of the previous study to find a relationship between sexual-specific anxiety and sexual risk-taking, this study sought to examine whether social anxiety related to sexual risk-taking behaviour.

Given that sexual encounters characteristically involve a number of components that could exacerbate trait anxiety, it is surprising that only a small number of studies to date have investigated the relationship between dimensions of social interaction anxiety and risky sexual practices (Hart & Heimberg, 2005; Hingson et al., 1990; Leary & Dobbins, 1983). The collective findings of these studies imply that elevated levels of social anxiety are linked to behaviours that increase one's chance of experiencing the many negative consequences associated with sexual behaviour. In the first of these studies, Leary & Dobbins (1983) examined the relationship between 'heterosexual anxiety' and a series of behavioural measures of sexuality in a sample of college students. Heterosexual anxiety was defined as 'anxiety arising from real, anticipated or imagined interactions with others of the opposite sex' (Leary & Dobbins, 1983, p.1348). Consistent with their expectations, the authors found that males and females who scored higher on this specific measure of social anxiety also reported higher levels of anxiety and apprehension regarding sex and in behavioural terms were less sexually experienced, reporting fewer sexual partners and also engaging in sex on a less frequent basis (Leary & Dobbins, 1983). Although the study found that males and females with higher levels of heterosexual anxiety engaged in sex less often, the results also indicated that heterosexually anxious females in particular were still at increased risk for negative consequences associated with sexual behaviour. Specifically, Leary & Dobbins (1983) reported that females who demonstrated higher levels of anxiety in situations with males were also less likely to discuss contraception with sexual partners and also reported later discussion of birth control relative to those with lower levels of social anxiety. This study therefore demonstrated one way in which social anxiety may act as an obstacle to enacting safe sexual practices such as condom use.

In a subsequent study, Hingson et al. (1990) investigated the relationship between health beliefs, behavioural cues and unprotected sex among 1773 adolescents in the US. In addition to elucidating which of the above variables predicted safer sex practices among male and female adolescents, Hingson et al. (1990) also examined the barriers to condom use in this sample. Supportive of Leary & Dobbins' (1983) above findings, the results of Hingson et al.'s (1990) study also suggested an association between social anxiety and unsafe sexual practices. In particular, Hingson et al. (1990) found that adolescents who indicated they would be embarrassed to use condoms with a sexual partner were also less likely to report using condoms during sexual intercourse.

Based on the above findings, Hart & Heimberg (2005) more recently conducted a study that directly examined the hypothesis that social anxiety increases the risk for unprotected anal intercourse (UAI). A sample of one hundred gay and bisexual male youth (aged between 16 and 21) were recruited from university settings or after-school educational and recreational education programs for the purposes of this study. Hart & Heimberg (2005) measured two related, yet also distinct, forms of social anxiety among the participants: social interactional anxiety and observation anxiety, as assessed by the Social Interaction Anxiety Scale (SIAS) and Social Phobia Scale (SPS) respectively (Mattick & Clarke, 1998). The analyses revealed that social interaction anxiety – that is anxiety regarding a variety of social situations – was not associated with sexual risk-taking assessed in this study. However, the key finding reported in this study was that observation anxiety – anxiety regarding situations in which one might be evaluated or scrutinised – was statistically associated with UAI. Furthermore, this effect was shown to persist after the influence of social support and communication about condom use was considered. These results extended those of Hingson et al. (1990) and suggest that social fears regarding situations in which one may be observed are associated with unprotected sex among samples of both heterosexual adults and homosexual males.

6.3 Aims of the Current Study

The literature reviewed in this thesis so far and the findings reported to date highlight a number of important issues. Firstly, the use of ecstasy is widely related to experiences of positive mood and euphoria and also to an increased sense of connection or affiliation with others. In addition, ecstasy for many individuals is related to a lowering of sexual inhibitions and the use of ecstasy is associated with elevated levels of sexual risk-taking. Second, research has shown that some individuals engage in risk-taking behaviours

– such as substance use and sexual practices – as a way of coping with anxiety and other negative mood states. The findings from the previous two studies of this thesis suggest that ecstasy use may have an effect primarily on those individuals who hold a specific set of beliefs regarding the disinhibiting effects of the drug on sexual behaviour. In addition, increasing levels of Neuroticism-Anxiety were associated with disinhibited sexual behaviour among regular ecstasy users. The research reviewed in the current chapter suggests that sexual-risk taking may be increased among those individuals who experience anxiety in particular about social situations. To date, there is no known research that has attempted to examine the impact of specific measures of anxiety, such as social interaction or social observation anxiety, on sexual risk-taking behaviour among regular ecstasy users.

In light of these findings, the present study endeavoured to explore the relationship between personality and sexual risk-taking behaviour in a sample of young adults. The specific focus of this study was to assess whether differences existed between young adults who had used ecstasy and those who had not, according to the personality variables that relate to risky sexual behaviour. The first aim of the current study was to examine which personality variables (using Zuckerman and Kuhlman's comprehensive model of personality) predict the use of ecstasy in a sample of young adults. Based on the literature to date, the current study aimed to replicate the finding observed in other studies that ecstasy users are differentiated from non-ecstasy users according to levels of impulsivity and sensation-seeking (Butler & Montgomery, 2004; Dughiero et al., 2001; Morgan, 1998; Parrott et al., 2000).

A second aim of the study was to examine the extent of sexual risk-taking behaviour in a sample of young adults, focussing on differences between ecstasy users and non-users in terms of an overall measure of sexual risk-taking and also at a more specific level with respect to individual 'risky' sexual practices. Subsequently, this study examines whether the personality traits that predict sexual risk-taking behaviour differ between individuals who use ecstasy and those who don't. The study importantly attempts to replicate the finding from the previous study in this thesis that neuroticism-anxiety predicts disinhibited sexual behaviour among regular ecstasy users. In addition to a broad measure of trait anxiety, this study will also explore whether social specific anxiety influences sexual risk-taking behaviour.

6.4 Method

6.4.1 Participants

One hundred and thirty-seven individuals volunteered to participate in the study; including 63 females (46%) and 74 males (54%). Participants were aged between 18 and 25 years old, with a mean age of 19 for both males (*S.D* =1.71) and females (*S.D* =1.27). Approximately one third (36%, n=49) of the participants had tried ecstasy at least once in their lifetime. Males (42%) were no more likely than females (29%) to have used ecstasy, $\chi^2 = 2.63, p = .11$.

6.4.2 Procedure

The data was collected over a five month period from February to July 2007. Participants were recruited using the same purposive sampling strategy techniques (Kerlinger, 1986) employed in the previous two studies. Initially participants responded to a series of advertisements placed in street press publications, followed by advertisements placed at university campuses, shopping centres and local bars. The focus of initial recruitment strategies was designed to obtain a sample of young adults aged between 18 and 25 who were willing to participate in a study that examined sexual risk-taking behaviour among young people. The targeted recruitment of ecstasy users then followed with a series of advertisements aimed at recruiting regular ecstasy users aged between 18 and 25 placed at the locations described above. Participants who completed the 2007 EDRS (Campbell & Degenhardt, 2008) were also given flyers for the current study on completion of the EDRS interview. On completion of the questionnaire, participants were given flyers that listed the contact details for the current study, if they felt their friends would be interested in participating. This study was approved by the ANU Human Research Ethics Committee (HREC).

Individuals who were interested in participating contacted the researcher by telephone, email, or face to face and were screened for eligibility for the study. Initially, males and females aged between 18 and 25 years were eligible to participate in the study. When recruitment focused on obtaining an ecstasy using sample, entry criterion was the use of ecstasy on a monthly basis in the previous six months in addition to the specified age criterion. In spite of a sustained effort to recruit a large sample of regular ecstasy users for the current study, this proved not possible. The difficulty experienced in recruiting a sample of regular ecstasy users for this study was similar to the experience of the EDRS researchers in the ACT in the same year (Campbell & Degenhardt, 2008). Based on the

recruitment experience for the studies conducted in previous years (Chapters Four and Five) there was no reason to expect this. In addition, there were no differences in the recruitment strategies utilised for the current study compared with those proving successful in previous years. Therefore the reasons for these recruitment problems still remain unknown. One of the consequences of the recruitment problem was that the inclusion criteria for the study needed to be changed. Comparisons on the variables of interest in this study were therefore made between young adults who had ever used ecstasy, and young adults who had never tried the drug.

Participants completed the questionnaire either in groups or individually at a location which was agreed upon by the researcher and participants. Before commencing the questionnaire, those individuals interested in participating in the study were provided with a study information form that included a written summary of the aims of the research. Participants were advised that they could withdraw their consent and discontinue participation from the study at any time, without prejudice. Those participants who were enrolled as first year psychology students at the ANU were given the choice of receiving cash payment (AUD $15) or one hour's course credit as reimbursement for their time on completion of the questionnaire. Participants who were not enrolled as first year psychology students at the ANU were provided with AUD $15 as reimbursement for their time and travel expenses.

6.4.3 Measures

A sixteen-page questionnaire was used for the purposes of this study. The first section of the questionnaire collected data on demographic information including: sex; age; Aboriginal and Torres Strait Islander (ATSI) status; sexual orientation; current relationship status; level of education obtained and current employment status. Section Two related to participants' use (past and current) of ecstasy and other substances. Section Three collected data regarding the recent sexual practices of participants. In the fourth section, participants responded to a shortened cross-cultural form of the Zuckerman-Kuhlman Personality Questionnaire (ZKPQ-50-CC) (Aluja et al., 2006). In the final two sections, the Social Interaction Anxiety Scale (SIAS) and Social Phobia Scale (SPS) (Mattick & Clarke, 1998) were completed by participants.

Drug Use History

Participants were first asked to indicate if they had ever injected a drug. For each of the drugs listed below participants were then asked to indicate whether they had ever used

the drug, whether they had used the drug in the past six months and if so, how often they had used the drug in the past six months (on a scale ranging from 'Daily' to 'Every couple of months'): ecstasy; alcohol; methamphetamine (powder, base and crystal forms were asked about collectively); cocaine; cannabis; tobacco; LSD; heroin; and benzodiazepines. Participants were also asked a series of questions specifically related to their ecstasy use, which included: the age at which they first tried ecstasy; whether they had ever used ecstasy on a regular (i.e. monthly) basis in their lifetime and the age at which they started to use ecstasy regularly.

Those participants who had used ecstasy in the past six months were also asked to indicate: their preferred route of ecstasy administration during this timeframe (injecting, snorting, swallowing, or shelving/shafting); the amount of ecstasy pills or tablets they had used in their 'typical' and 'heaviest' episodes of use in the past six months (on a scale ranging from 0.5 tabs to 5 or more tabs); whether they had binged on ecstasy in the past six months; whether they 'typically' used drugs in combination with ecstasy (and if so, which drugs); and whether they 'typically' used other drugs to facilitate their 'comedown', also nominating which drugs were used with ecstasy in this context.

Sexual Practices Survey

In the third component of the questionnaire, participants were administered a series of questions relating to sexual risk behaviour in the past six months. Participants were first asked to indicate how many sexual partners they had in the past six months. The frequency with which participants had used condoms with both 'regular' and 'casual' partners was also assessed using the following scale: 1 = Haven't had sex with a Regular/Casual partner; 2 = Every time; 3 = Often; 4 = Sometimes; 5 = Rarely; 6 = Never. The frequency of condom use was also assessed if participants reported that they had engaged in a one night stand, and/or anal sex in the past six months. Participants were also asked whether they had had sex under the influence of drugs or alcohol in the previous six months (and if so, which substances), and then specifically whether they had had unsafe (defined as sex without the use of protective barriers such as condoms) and unintended sex (defined as sex under the influence of substances when you otherwise wouldn't have) under the influence of substances. In addition to examining responses to each of the sexual risk-taking items individually, a cumulative scale of sex-risk taking was also calculated. Where required, participant's answers to each of the questions were converted into a dichotomous score (0 = No Risk, 1 = Risk). The responses across twelve measures of sexual risk-taking were then summed to form the sexual risk-taking scale, wherein a higher

score reflected higher level of involvement in sexual risk-taking behaviours over the past six months. The Cronbach's alpha (α) statistic was .86 showing satisfactory internal consistency for the purpose of research.

Zuckerman Kuhlman Personality Questionnaire 50-Item Cross-Cultural Version (ZKPQ-50-CC) (Aluja et al., 2006)

The ZKPQ-50-CC (see Appendix C.1) is a shortened 50-item version of the ZKPQ scale (Zuckerman et al., 1993) which assesses the same five personality domains captured in the original version of the questionnaire (impulsive sensation-seeking; neuroticism-anxiety; aggression-hostility; activity and sociability) with 10 items comprising each subscale. The development of this shortened measure of personality involved exploratory and confirmatory factor analytic techniques using data from four countries; Germany, America, Switzerland and Spain (Aluja et al., 2006). The psychometric properties reported for the ZKPQ-50-CC in the validation study of this questionnaire were similar to those reported for the original questionnaire (Aluja et al., 2006). Correlations between the short form of the scale and the original version were around 0.90 (Aluja et al., 2006) and the alpha consistency average of the five scales in this shortened version have proved adequate in two other studies and across different cultures (Aluja et al., 2006; Aluja, Rossier, & Zuckerman, 2007). In addition to the sound psychometric properties of the ZKPQ-50-CC, this measure of personality was chosen for the purposes of the current study because it does not contain items that make reference to alcohol use, drug use, or sexual behaviour. Furthermore, this shortened version of the original ZKPQ considerably reduces the administration time at what has been identified as an insignificant cost in terms of reliability (Aluja, Garcia, Cuevas, & Garcia, 2007; Aluja et al., 2006; Aluja, Rossier et al., 2007).

Social Interaction Anxiety Scale (SIAS) and Social Phobia Scale (SPS) (Mattick & Clarke, 1998)

Participants were administered the SIAS (see Appendix C.2) and SPS (see Appendix C.3) to assess social anxiety. The SIAS and SPS are companion instruments that measure two related although distinct dimensions of social anxiety; the fear of interacting in social situations and the fear of being observed by others (E. Brown et al., 1997; Cox & Swinson, 1995; Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992; Mattick & Clarke, 1998).

The SIAS consists of 20 self-statements that participants respond to using a five point Likert scale that ranges from zero ('Not at all characteristic or true of me') to four ('Extremely characteristic or true of me'). Each statement describes an individual's typical reaction to a situation that involves some form of social interaction, for example; 'I tense up if I meet an acquaintance in the street', and 'When mixing in a group I find myself worrying I will be ignored'. In the current study, one item on the SIAS (Item 14, see Appendix C.2) was altered to increase its appropriateness for those respondents who identify as homosexual. The total SIAS score is obtained by summing the ratings across the 20 items, after the three positively worded items in the SIAS have been reverse scored. Total scores for the SIAS range from 0 to 80, with higher scores representing higher levels of social interaction anxiety.

Similarly, the SPS contains 20 self-statements that are rated on the same Likert scale described above for the SIAS. Items in the SPS however relate specifically to fears of being observed or scrutinised by others during routine activities such as public speaking, or eating or writing in public. For example 'I feel self-conscious if I have to enter a room where others are already seated' and 'I would find it difficult to drink something if in a group of people.' All items in the SPS are negatively worded and as with the SIAS scores range from 0 to 80 with higher scores reflective of higher levels of observational anxiety.

There is now an extensive literature that attests to both the strong psychometric properties and practical utility of the SIAS and SPS (E. Brown et al., 1997; Cox & Swinson, 1995; Hart & Heimberg, 2005; Heimberg et al., 1992; Mattick & Clarke, 1998; Osman, Gutierrez, Barrios, Kopper, & Chiros, 1998). Both scales have demonstrated high internal consistency scores across populations involving adult community members (Heimberg et al., 1992), undergraduate students (Osman et al., 1998; Tran, Haaga, & Chambless, 1997), social phobic patients (Mattick & Clark, 1998; Mattick & Clarke 1989, as reported in Cox, 1995), patients with anxiety disorders other than social phobia (E. Brown et al., 1997), and a high-risk sample of young gay and bisexual men (Hart & Heimberg, 2005). Reported test-retest reliability statistics for the SPS and SIAS at four and twelve weeks are also sound (Heimberg et al., 1992; Mattick & Clarke, 1998). Support for the convergent and discriminant validity of the scales is also available in the literature (E. Brown et al., 1997; Heimberg et al., 1992; Mattick & Clarke, 1998).

6.5 Results

The results of this study will be presented in four sections. The first section describes the demographic characteristics and patterns of ecstasy and other drug use for this sample. Statistical comparisons are made between participants who had ever used ecstasy and those who had not, first with respect to demographic variables and then in terms of patterns of substance use. In the second section the response of participants to the ZKPQ-50-CC are presented. There is research to suggest that the personality profile of ecstasy users is different to that observed in non-drug using and polydrug using controls (Butler & Montgomery, 2004; Dughiero et al., 2001; Morgan, 1998; Parrott et al., 2000; Schifano, 2000). The relationship between personality features and ecstasy use is examined in this section through the use of logistic regression analyses which are conducted separately for males and females. In the third section, the response of participants to the SIAS and SPS are presented. The final section then describes the sexual behaviour of this sample within the previous six months. The results of analyses conducted to examine whether sexual risk-taking behaviours varies according to a history of ecstasy use are reported. The analyses conducted to explore whether personality and social anxiety relate to sexual risk-taking differently for ecstasy users versus non-ecstasy users are then presented.

6.5.1 Sample Characteristics

The majority of participants indicated that they were heterosexual (93%), with 6% of the sample identifying as bisexual and 1% as gay male. In respect to their current relationship status, two-thirds (66%) of the sample were single and 34% reported currently being in a relationship. No participant identified as Aboriginal or Torres Strait Islander. The sample had high levels of education with almost the entire (95%) sample having completed their Higher School Certificate (HSC) or equivalent. Almost all (91%) respondents were studying on a full-time basis at the time of participation. Six percent of the sample indicated that they were currently employed on a part-time or casual basis, 3% percent of the sample was unemployed and 2% was employed in full-time positions.

Table 6.1 presents information on the demographic information for the sample with respect to the differences between ecstasy users and non-users. There was no statistical difference in ecstasy use between males and females or according to the level of education attained. However, ecstasy users (62%) were more likely to be in a relationship at the time of interview than non-ecstasy users (38%), χ^2 (1, N =137) = 20.95, $p < .001$,

and similarly, there was also a significant difference between ecstasy users and non-users according to their current student enrolment status. Ecstasy users (32%) were much less likely to be enrolled full-time as students at the time of interview than those who had never tried ecstasy (68%), χ^2 (1, N = 137) = 7.00, $p < .01$.

Table 6.1

Demographic Characteristics for Ecstasy Users (n = 49) and Non-Users (n = 88)

Variable	Ecstasy Users		Non-Ecstasy Users		Total
	n	%	*n*	%	*N*
Sex of Participant					
Male	31	42	43	58	74
Female	18	29	45	71	63
Sexual Orientation					
Heterosexual	46	36	81	64	127
Homosexual/Bisexual	3	30	7	70	10
Relationship status					
In a relationship	29	62	18	38	47***
Not in a relationship	20	22	70	78	90
Highest education level					
Attained HSC	47	35	88	65	135
Didn't attain HSC	2	100	0	0	2
Student enrolment status					
Currently full-time student	40	32	84	68	124***
Not a full-time student	9	70	4	30	13

*$p < .05$, **$p < .01$, ***$p < .001$

Participants in this sample had used a median of three of the nine substances directly asked about (ecstasy, alcohol, methamphetamine, cocaine, cannabis, tobacco, LSD, heroin, benzodiazepines) in their lifetime. Table 6.2 presents the rates of lifetime and recent (past six months) substance use for this sample. As seen in Table 6.2, almost all (91%) participants reported ever having tried alcohol, with just over half also having tried tobacco (55%) and cannabis (54%). Approximately one quarter (24%) of the sample had tried some form of methamphetamine before, with a similar proportion of the sample also having

used cocaine (22%) in their lifetime. LSD was taken by 15% of the sample, with a minority of the sample reporting use of benzodiazepines (6%) and heroin (2%).

Table 6.2

Lifetime and Recent Drug Use History

Substance	$N = 137$	
	n	%
Ecstasy		
Ever Used	49	36
Recently Used	45	33
Alcohol		
Ever Used	125	91
Recently Used	117	85
Methamphetamine [a]		
Ever Used	33	24
Recently Used	18	13
Cocaine		
Ever Used	30	22
Recently Used	18	13
Cannabis		
Ever Used	74	54
Recently Used	49	36
Tobacco		
Ever Used	75	55
Recently Used	55	40
LSD		
Ever Used	20	15
Recently Used	14	10
Heroin		
Ever Used	2	2
Recently Used	0	0
Benzodiazepines		
Ever Used	8	6
Recently Used	3	2

Note: [a] Methamphetamine forms (powder, base and crystal) were asked about collectively

Thirty six percent of the sample had tried ecstasy at least once in their lifetime. The mean age at which participants reported first trying ecstasy was 18 (*Range* = 13 - 21, *SD* = 1.64) and this did not differ between males and females. The majority (78%) of participants who had tried ecstasy had also used the drug at least on a monthly basis at some stage in their life. The mean age at which participants had started using ecstasy on a regular basis was 19 (*Range* = 15 - 24, *SD* = 1.57) and this also did not differ according to sex.

In terms of recent substance use, participants reported having used a median of two drugs in the six months prior to interview. The proportion of respondents who had used each substance in the past six months reflected the same patterns observed when examining lifetime rates of substance use. Alcohol (85%) was most the most widely used drug in this sample in the past six months, followed by tobacco (40%) and cannabis (36%). Similar numbers of respondents had also used methamphetamine (13%), cocaine (13%) and LSD (10%) in the preceding six months, with a minority having used benzodiazepines (2%, $n = 3$) and no participant reporting having used heroin in this period of time.

Ecstasy users (*Mdn* = 6) reported having taken a significantly larger number of drugs in their lifetime compared to those individuals who had never used ecstasy (*Mdn* = 1, $U = 56.00, p < .001$). This finding is consistent with existing research examining patterns of substance use by ecstasy users (Black et al., 2008; Breen et al., 2004; Butler & Montgomery, 2004; Dunn et al., 2007; Lenton et al., 1997; Parrott et al., 2001; Schifano et al., 1998; Solowij et al., 1992; Stafford et al., 2005; Stafford et al., 2006; Strote et al., 2002; Topp, Hando, & Dillon, 1999; Topp, Hando, Dillon et al., 1999) and also the results obtained in the previous two studies of this thesis. Table 6.3 presents the rates of lifetime substance use for this sample of young adults as a function of ecstasy use. As observed in Table 6.3, the proportion of participants who reported having tried each substance was significantly higher for participants who had tried ecstasy compared to those who had not, with the exception of heroin, where only two people in the whole sample reported ever having used heroin. Specifically, ecstasy users and non-users differed significantly on their lifetime use of alcohol, $\chi^2 (1, N = 137) = 7.32, p < .01$, methamphetamine, $\chi^2 (1, N = 137) = 64.03, p < .001$, cocaine, $\chi^2 (1, N = 137) = 68.98, p < .001$, cannabis, $\chi^2 (1, N = 137) = 43.93, p < .001$, tobacco, $\chi^2 = (1, N = 137) = 29.53, p < .001$, LSD, $\chi^2 (1, N = 137) = 29.98, p < .001$ and benzodiazepines, $\chi^2 (1, N = 137) = 9.90, p < .01$. As was the case when examining lifetime drug use, ecstasy users (*Mdn* = 4) reported also having used a greater number of

substances in the past six months than did non-ecstasy using young adults (*Mdn* = 1, *U* =137.00, $p < .001$).

Table 6.3

Lifetime Drug Use History According to History of Ecstasy Use

Substance	Ecstasy Users $n = 49$		Non-Ecstasy Users $n = 88$		Total $N = 137$
	n	%	*n*	%	*N*
Ever Used Alcohol					
Yes	49	100	76	86	125***
No	0	0	12	14	12
Ever Used Methamphetamine [a]					
Yes	31	63	2	2	33***
No	18	37	86	98	104
Ever Used Cocaine					
Yes	30	61	0	0	30***
No	19	39	88	100	107
Ever Used Cannabis					
Yes	45	92	29	33	74***
No	4	8	59	67	63
Ever Used Tobacco					
Yes	42	86	33	38	75***
No	7	14	55	62	62
Ever Used LSD					
Yes	18	37	2	2	20***
No	31	63	86	98	117
Ever Used Heroin					
Yes	1	2	1	1	2
No	48	98	87	99	135
Ever Used Benzodiazepines					
Yes	7	14	1	1	8**
No	42	86	87	99	129

Note: [a] Methamphetamine forms (powder, base and crystal) were asked about collectively

*$p < .05$, **$p < .01$, ***$p < .001$

Ninety two percent of those participants who had ever tried ecstasy reported having used ecstasy in the previous six months. The most common pattern of use during this timeframe was on a monthly to fortnightly basis (45%), with approximately one third (31%) using every couple of months and 20% having used on a weekly basis in this period of time. The observed patterns of ecstasy use among the recent users in this sample are consistent with those observed in the previous two studies of this thesis which employed samples of 'regular' ecstasy users. When examining the preferred route of ecstasy administration, all but one participant (98%) reported the primary mode of administration in the past six months as swallowing, with one participant (2%) having mainly snorted ecstasy. The majority (73%) of recent ecstasy users typically reported consuming between one and two pills in a standard or typical episode of use. When asked about the number of pills taken in their biggest episode of use, over half (58%) reported using three or more pills and 42% used between one and two pills during these episodes. Approximately one third (31%) of ecstasy users also reported that they had binged (defined as having used ecstasy for 48 hours or more without sleep) on ecstasy in the previous six months. Eighty seven percent of participants who had used ecstasy in the past six months indicated that they typically used other substances in combination with ecstasy and similarly 71% also indicated that they used other drugs to facilitate the comedown period. The drugs most commonly reported to be used in this way were alcohol, cannabis and tobacco.

6.5.2 Personality

The internal consistency scores (α) obtained for the five ZKPQ-50-CC scales in this sample were satisfactory for research purposes: activity = .74; aggression-hostility = .72; sociability = .69; impulsive sensation-seeking = .77 and neuroticism-anxiety = .82. In this sample of young adults sociability was strongly and positively correlated with impulsive sensation-seeking ($r = .46, p < .001$) and negatively correlated with neuroticism-anxiety ($r = -.26, p < .01$). Neuroticism-anxiety was also positively correlated with the personality measure of aggression-hostility ($r = .27, p < .01$) in this sample and negatively correlated with impulsive sensation-seeking ($r = -.20, p < .05$).

A series of t-tests were first performed to assess whether significant differences existed between males and females according to the five ZKPQ-50-CC scales. As can be observed in Table 6.4, significant differences were observed between males and females according to measures of impulsivity and neuroticism. Such differences are consistent with established research findings. Specifically, scores on the impulsive sensation-seeking scale were higher for males ($M = 6.50$, $SD = 2.53$) than females ($M = 5.15$, $SD = 2.85$), $t(131) =$

-2.90, $p < .01$ (Aluja et al., 2002; Goma-i-Freixanet et al., 2004; Zuckerman & Kuhlman, 2000; Zuckerman et al., 1993). Conversely, there was a significant difference between males and females on the neuroticism-anxiety scale, with females ($M = 6.02$, $SD = 2.81$) scoring higher on this personality dimension than males ($M = 3.68$, $SD = 2.71$), $t(135) = 4.96$, $p < .001$ (Aluja et al., 2002; Ball, 1995; Costa Jr et al., 2001; Goma-i-Freixanet et al., 2004; Goma-i-Freixanet et al., 2005; Zuckerman & Kuhlman, 1998, 2000; Zuckerman et al., 1993). No significant differences were found between males and females for measures of sociability ($t(134) = -1.73$, $p = .09$), aggression-hostility ($t(134) = -.91$, $p = .37$), or activity ($t(133) = -.59$, $p = .59$) (see Table 6.4).

Table 6.4

Means and Standard Deviations for ZKPQ-50-CC Personality Variables According to Sex

Subscale	Males $n = 74$		Females $n = 63$	
	M	*SD*	*M*	*SD*
Activity	4.26	2.71	4.02	2.52
Aggression-Hostility	4.96	2.56	4.55	2.71
Sociability	5.80	2.91	4.95	2.74
Impulsive Sensation-Seeking	6.50	2.53	5.15**	2.85
Neuroticism-Anxiety	3.68	2.71	6.02***	2.81

*$p < .05$, **$p < .01$, ***$p < .001$

In previous research the use of ecstasy has been associated with personality characteristics relating to sensation-seeking and impulsivity (Butler & Montgomery, 2004; Dughiero et al., 2001; Morgan, 2000; Parrott et al., 2000; Schifano, 2000). Preliminary t-tests were conducted to assess any differences between ecstasy users and non-users on the five personality scales assessed. On the basis of the documented sex differences observed for some measures of personality in this sample, as well as those observed in previous research, this analysis was performed separately for males and females. Table 6.5 presents the means and standard deviations for each of the ZKPQ-50-CC scales for males and females wherein ecstasy users are compared to non-ecstasy users. As observed in Table 6.5, male ecstasy-users differed from male non-users on two of the five ZKPQ-50-CC personality measures. Specifically, there was a significant difference between male ecstasy

users (M = 5.84, SD = 2.60) and non-users (M = 4.33, SD = 2.36) on the aggression-hostility scale, with male ecstasy users scoring significantly higher than male non-users ($t(72) = -2.61, p < .05$). As predicted, male ecstasy users (M = 7.87, SD = 1.83) also scored significantly higher than non-users (M = 5.52, SD = 2.52) on the personality measure of impulsive sensation-seeking ($t(70) = -4.33, p < .001$). Male ecstasy users (M = 6.55, SD = 2.74) were also higher than non-users (M = 5.26, SD = 2.95) on the sociability scale, although this difference did not reach significance ($t(72) = -1.92, p = .06$). No significant differences were found between males according to their use of ecstasy on measures of activity ($t(70) = .52, p = .61$) or neuroticism-anxiety ($t(72) = .26, p = .80$).

Table 6.5

Means and Standard Deviations on Ecstasy Use for ZKPQ-50-CC Personality Variables According to Sex

Subscale	Ecstasy Users n = 49		Non-Ecstasy Users n = 88	
	M	*SD*	*M*	*SD*
Activity				
Male	4.07	2.49	4.40	2.88
Female	4.50	2.33	3.82	2.59
Aggression-Hostility				
Male	5.84	2.60	4.33*	2.36
Female	5.83	2.98	4.02*	2.44
Sociability				
Male	6.55	2.74	5.26	2.95
Female	6.65	2.32	4.31**	2.63
Impulsive Sensation-Seeking				
Male	7.87	1.83	5.52***	2.52
Female	7.06	2.93	4.41**	2.48
Neuroticism-Anxiety				
Male	3.58	2.92	3.74	2.57
Female	7.28	2.45	5.51*	2.81

*$p < .05$, **$p < .01$, ***$p < .001$

When examining personality differences according to ecstasy use within the female sample, significant differences existed on all but one measure of personality (activity: ($t(61) = -.97$, $p = .34$). In addition, the observed patterns in these differences were consistent with those described for males above (see Table 6.5). Consistent with prediction, females ecstasy users ($M=7.06$, $SD = 2.93$) scored higher on measures of impulsive sensation-seeking than non-ecstasy using females ($M=4.41$, $SD = 2.48$) ($t(59) = -3.56, p < .01$).

Similarly, females who had used ecstasy ($M = 6.65$, $SD = 2.32$) also scored higher on measures of sociability than non-ecstasy using females ($M = 4.31$, $SD = 2.63$) ($t(60) = -3.22, p < .01$). Additionally, female ecstasy users ($M = 5.83$, $SD = 2.98$) were also significantly higher than non-users ($M = 4.02$, $SD = 2.44$) on the measure of aggression-hostility ($t(60) = -2.49, p < .05$). Female ecstasy users ($M = 7.28$, $SD = 2.45$) also scored significantly higher than non-ecstasy users ($M = 5.51$, $SD = 2.81$) on the trait measure of neuroticism-anxiety ($t(61) = -2.34, p < .05$). This difference was not observed for males.

The next stage of the analysis compared the utility of the personality predictors and determined which personality variables (when entered simultaneously into a logistic regression model) significantly predicted ecstasy use for males and females. This was due to the well established gender differences between males and females on key aspects of personality and also allows for the fact there were significant differences between users and non-users on measures of sociability and neuroticism-anxiety for females which were not observed for males.

Table 6.6

Final Logistic Regression Model for ZKPQ-50-CC Personality Variables as Predictors of Ecstasy Use for Males

Variable	*B*	*SE*	*p*	*OR (95% CI)*
ZKPQ Aggression-Hostility	.31	.13	.01	1.37 (1.07 – 1.75)
ZKPQ Impulsive Sensation-Seeking	.52	.14	.000	1.68 (1.27 – 2.21)
χ^2 (2, $N = 72$) = 24.27, $p < .0001$				

On the basis of the preliminary analyses, the full model specified to predict ecstasy use among males included two ZKPQ-50-CC variables; aggression-hostility and impulsive

sensation-seeking. As seen in Table 6.6, both these variables emerged as significant predictors in the model of ecstasy use, χ^2 (2, N = 72) = 24.27, p < .0001. These results indicate that the chance of males having used ecstasy increases as their scores on trait measures of aggression-hostility and impulsive sensation-seeking also increase (Table 6.6).

In the logistic regression analysis examining ecstasy use among females, four personality variables were entered into the model to determine the predictors of ecstasy use; aggression-hostility, impulsive sensation-seeking, neuroticism-anxiety and sociability. Employing the backward elimination procedure, two of the personality variables (impulsive sensation-seeking and neuroticism-anxiety) emerged as significant (see Table 6.7, χ^2 (2, N = 61) = 19.62, p < .0001). Specifically, these results suggested that as females' scores on measures of impulsivity and neuroticism increased, so did the likelihood of their ever having used ecstasy. It is important to note that the Hosmer-Lemeshow statistic was significant for this model (p = .028), which brings into question its goodness of fit. However, for small sample sizes (less than N = 400) it has been suggested the Hosmer-Lemeshow statistic be interpreted with caution (Hosmer & Lemeshow, 2000).

Table 6.7

Final Logistic Regression Model for ZKPQ-50-CC Personality Variables as Predictors of Ecstasy Use for Females

Variable	*B*	*SE*	*p*	*OR (95% CI)*
ZKPQ Neuroticism-Anxiety	.37	.15	.014	1.45 (1.08 – 1.95)
ZKPQ Impulsive Sensation-Seeking	.47	.15	.002	1.60 (1.19 – 2.15)
χ^2 (2, N = 61) = 19.62, p < .0001				

6.5.3 Social Anxiety

High internal consistency scores (α) were also found for the SIAS and SPS in the present sample: SIAS = .91, SPS = .91. As observed in previous research (Hart & Heimberg, 2005; Heimberg et al., 1992) the SIAS and SPS were significantly correlated in this study (r = .76, p < .001). The two measures however were not combined (consistent with the previous research), so that the analyses could allow for exploration of whether a specific dimension of social anxiety may relate to risky sexual behaviour.

Levels of social interactional and observational anxiety were defined with reference to the mean SIAS and SPS scores of socially phobia individuals (Heimberg et al., 1992; Tran et al., 1997). 'Low' anxiety was defined as two or more *SD* between the mean score obtained for each scale, 'moderate' anxiety was between one and two *SD* below the mean and 'high' anxiety was within one *SD* of the mean score of socially phobic clients. For the SIAS, according to these criteria the majority (79%) of participants reported 'low' (37%) to 'moderate' (42%) social anxiety and approximately one in five (21%) reported 'high' social anxiety. When examining rates of observational anxiety (SPS), the majority of participants still reported 'low' (4%) to 'moderate' (52%) levels of anxiety, although 44% of participants in this sample demonstrated 'high' levels of observational anxiety.

In prior studies, age and gender have been reported to be unrelated to participants' responses to the SIAS and SPS (E. Brown et al., 1997; Osman et al., 1998). In this study, age was not significantly related to scores on the SIAS or SPS, however significant differences did exist according to sex (see Table 6.8). Specifically, females ($M = 25.79$, $SD = 13.39$) reported higher levels of social interaction anxiety than did males ($M = 21.38$, $SD = 11.92$, $t(134) = 2.03, p < .05$) and in addition females ($M = 21.70$, $SD = 12.22$) also scored significantly higher on the measure of observational anxiety than males ($M = 15.23$, $SD = 11.61$, $t(135) = 3.17, p < .01$).

In order to examine relationships that may exist between social anxiety and broad personality traits, scores on the SIAS and SPS were correlated with the five ZKPQ-50-CC scales. A number of significant correlations were observed between scores on the SIAS and SPS and the personality domains assessed by the ZKPQ-50-CC. Firstly, both the SIAS and SPS were negatively correlated with both the sociability and impulsive sensation-seeking subscales of the ZKPQ-50-CC. In particular, those individuals who were more anxious in both social and evaluative situations were less likely to seek continual social interactions (SIAS $r = -.43, p < .001$; SPS $r = -.42, p < .001$), or score highly on a measure of impulsive sensation-seeking (SIAS $r = -.37, p < .001$; SPS $r = -.36, p < .001$). A significant positive correlation was observed between scores on the SIAS and SPS and neuroticism-anxiety. As might be expected, individuals who were high on general levels of neuroticism-anxiety were also higher on social specific measures of anxiety (SIAS $r = .46, p < .001$; SPS $r = .52, p < .001$).

Table 6.8

Means and Standard Deviations on Ecstasy Use for SIAS and SPS by Sex of Participant

	Ecstasy Users		Non-Ecstasy Users		Total	
	$n = 49$		$n = 88$		$N = 137$	
	M	*SD*	*M*	*SD*	*M*	*SD*
SIAS						
Male	18.00	11.32	23.81*	11.87	21.38	11.92
Female	23.22	11.87	26.84	13.96	25.79*	13.39
SPS						
Male	12.68	13.04	17.07	10.22	15.23	11.61
Female	21.94	14.81	21.60	11.22	21.70**	12.22

*$p < .05$, **$p < .01$, ***$p < .001$

In addition to presenting the means and standard deviations for participants on the measures' of social anxiety, Table 6.8 also presents within sex differences according to ecstasy use for each of the SIAS and SPS measures. As can be seen in Table 6.8, ecstasy using males and non-using males were differentiated only in terms of the scores on the SIAS, with non-users ($M = 23.81$, $SD = 11.87$) scoring significantly higher than ecstasy users ($M = 18.00$, $SD = 11.32$) on this measure of social interaction anxiety $t(72) = .54$, $p < .05$. No differences existed between female ecstasy users and female non-ecstasy users on the measures of social anxiety assessed.

6.5.4 Sexual Behaviour

6.5.4.1 General Patterns in Recent Sexual Behaviour

Table 6.9 presents data on the sexual practices of this sample of young adults in the preceding six months. Over half (58%) the sample reported having had penetrative sex, where that was defined as 'the penetration of the vagina/anus by penis/fist,' in the past six months. Of this group, 60% reported having sex with one person during this period of time, approximately one in five (21%) had sex with two partners and a similar proportion (19%) reported having sex with three or more partners in the past six months. The majority (86%) of sexually active participants reported having sex with a 'regular' partner and almost half (48%) reported having sex with a 'casual' partner in the preceding six months. Over one third (39%) of sexually active participants had a one night stand in the past six months and a minority (15%) reported anal sex (see Table 6.9).

The frequency of condom use was examined in relation to a number of sexual activities. Among those who had sex with a regular partner in the past six months, three quarters (75%) reported inconsistent condom use during this period of time and only one quarter (25%) reported using condoms on every occasion. Among those who had sex with a casual partner in the preceding six months, half (50%) reported always using condoms and half (50%) reported inconsistent condom use. The pattern of less consistent condom use with regular as opposed to casual partners observed in this study corresponds with the previous two studies reported in this thesis and other Australian research (de Visser et al., 2003c; Van de Ven et al., 2002; Van de Ven et al., 2004).

The majority (65%) of participants who reported having a one night stand in the previous six months indicated they had only done so once. Almost half (48%) reported they had had a one night stand with someone they did not know and a similar proportion (42%) of respondents indicated they had used condoms inconsistently when having a one night stand. Overall, the occurrence (15%) and frequency of anal sex was relatively low in this sample, with 'monthly or less than monthly' frequency being the most common pattern in the past six months. Half (50%, $n = 6$) of those participants who reported having had anal sex reported that they did not always use condoms in the past six months.

Eighty four percent of sexually active participants reported having sex under the influence of drugs or alcohol in the past six months (Table 6.9). The substances most commonly used prior to sex were alcohol (99%) and ecstasy (49%), followed by cannabis (25%), methamphetamine (13%), cocaine (9%) and LSD (3%). Of those participants who reported having sex under the influence of substances, two thirds (67%) reported having 'unsafe' or unprotected sex under the influence and approximately one third (36%) reported having unintended sex under the influence of substances (Table 6.9). Again, the substances under which participants most commonly reported having unsafe and unintended sex were alcohol, ecstasy, cannabis and methamphetamine.

Table 6.9

Sexual Behaviour of a Sample of Young Adults (N = 137)

	Total (%)
Penetrative sex in past six months	58
Number of sexual partners past six months [a]	
One partner	60
Two partners	21
3 or more	19
Had sex with a regular partner [a]	86
Always used condoms	25
Inconsistent condom use	75
Had sex with a casual partner [a]	48
Always used condoms	50
Inconsistent condom use	50
Had a 'one night stand' [a]	39
Always used condoms	58
Inconsistent condom use	42
Anal sex [a]	15
Always used condoms	50 (n = 6)
Inconsistent condom use	50 (n = 6)
Had sex under the influence of drugs or alcohol [a]	84
Had unsafe sex under the influence of drugs or alcohol [b]	67
Had unintended sex under the influence of drugs or alcohol [b]	36

[a] Of those who were sexually active in the past six months, n = 80

[b] Of those who had sex under the influence of substances in the past six months, n = 67

6.5.4.2 Sexual Risk-Taking Behaviour According to Ecstasy Use

As explained in the Method, a sexual risk-taking scale score was calculated to reflect the overall level of sexual risk-taking behaviour participants had engaged in over the previous six months. The median sex risk score for the entire sample was one, with a range of 0 to 10 (SD = 2.83). There were no differences between males (Mdn = 1, SD = 2.90) and females (Mdn = 1, SD = 2.77) according to their overall level of sexual risk-taking (U = 2321.50, p = .97).

The Mann-Whitney *U* test was used to assess whether ecstasy users and non-ecstasy users differed in terms of the level of sexual risk taking they had engaged in over the past six months. Consistent with literature that links ecstasy use with increased involvement in risky sexual behaviours (Boyd et al., 2003; Choi et al., 2005; Klitzman et al., 2002; Klitzman et al., 2000; Mattison et al., 2001; Novoa et al., 2005; Strote et al., 2002; Theall et al., 2006; Topp, Hando, & Dillon, 1999; Waldo et al., 2000), a significant difference existed between ecstasy users and non-ecstasy users according to this overall measure of sexual risk-taking. Specifically, ecstasy users (*Mdn* = 4, *SD* = 2.43) had engaged in a significantly greater number of sexual risk taking behaviours in the past six months compared to those young adults who had never used ecstasy (*Mdn* = 0, *SD* = 2.40; $U = 648.00, p < .001$).

Table 6.10

Differences in Rates of Sexual Risk-Taking Behaviour According to History of Ecstasy Use

	Ecstasy Users $n = 49$		Non-Ecstasy Users $n = 88$		Odds Ratio (95% CI)
	n	%	*n*	%	
Number of sexual partners					
Multiple partners	22	45	10	11	
0 or 1 sexual partner	27	55	78	89	6.36 (2.67 – 15.11)***
Unsafe sex with a 'regular' partner					
Yes	31	63	21	24	
No	18	37	67	76	5.50 (2.57 – 11.75)***
Unsafe sex with a 'casual' partner					
Yes	12	25	7	8	
No	37	75	81	92	3.75 (1.37 – 10.30)**
Had a one night stand					
Yes	19	39	12	14	
No	30	61	76	86	4.01 (1.74 – 9.27)**

*$p < .05$, **$p < .01$, ***$p < .001$

Table 6.10 (continued)

Differences in Rates of Sexual Risk-Taking Behaviour According to History of Ecstasy Use

	Ecstasy Users		Non-Ecstasy Users		Odds Ratio (95% CI)
	n = 49		*n* = 88		
	n	%	*n*	%	
Multiple one night stands					
Yes	9	18	2	2	
No	40	82	86	98	9.68 (2.00 – 46.85)**
Had a one night stand with someone unknown					
Yes	10	20	5	6	
No	39	80	83	94	4.26 (1.36 – 13.30)**
Had unsafe sex with one night stand					
Yes	8	16	5	6	
No	41	84	83	94	3.24 (1.00 – 10.52)*
Had anal sex					
Yes	10	20	4	5	
No	39	80	84	95	5.39 (1.59 – 18.24)**
Had unprotected anal sex					
Yes	5	10	1	1	
No	44	90	87	99	9.89 (1.12 – 87.23)*
Had sex under the influence of substances					
Yes	45	92	22	25	
No	4	8	66	75	33.75 (10.89 – 104.56)***
Had unsafe sex under the influence of substances					
Yes	29	59	16	18	
No	20	41	72	82	6.53 (2.97 – 14.32)***
Had unintended sex under the influence of substances					
Yes	15	31	9	10	
No	34	69	79	90	3.87 (1.55 – 9.71)**

*$p < .05$, **$p < .01$, ***$p < .001$

Subsequent to the analysis of the overall sex risk-scale, each component item of the sex-risk scale was examined individually to assess whether differences existed according to gender, and also history of ecstasy use. The analysis of individual items revealed that no differences existed between males and females with respect to involvement in each of the sex risk variables. However, the analyses revealed that ecstasy users were statistically more likely than non-users to have engaged in each of the sexual risk-taking behaviours assessed in this study, as presented in Table 6.10. Specifically, ecstasy users (45%) were more likely than non-users (11%) to have had multiple (two or more) sexual partners in the past six months, *OR* = 6.36 (*95% CI*: 2.67 – 15.11). Ecstasy users (63%) were also more likely than non-users (24%) to have had unsafe sex with a regular partner (*OR* = 5.50, *95% CI*: 2.57 – 11.75) and also to have had unprotected sex with a casual sex partner (ecstasy users = 25%, non-users = 8%, *OR* = 3.75, *95% CI*: 1.37 – 10.30).

In the previous six months ecstasy users (39%) were also more likely than non users (14%) to have had a one night stand, *OR* = 4.01 (*95% CI*: 1.74 – 9.27), to have had multiple one night stands, (ecstasy users = 18%, non-users = 2%, *OR* = 9.68, *95% CI*: 2.00 – 46.85), to have had a one night stand with someone they did not know (ecstasy users = 20%, non-users = 6%, *OR* = 4.26, *95% CI*: 1.36 – 13.30), and to have had unprotected sex on a one night stand (ecstasy users = 16%, non-users = 6%, *OR* = 3.24, *95% CI*: 1.00 – 10.52).

Additionally, more ecstasy users (20%) than non-users (5%) indicated they had anal sex (*OR* = 5.39 (*95% CI*: 1.59 – 18.24) and unprotected anal sex in the past six months (ecstasy users = 10%, non-users = 1%, *OR* = 9.89, *95% CI*: 1.12 – 87.23). The rates of involvement in anal sex or unsafe anal sex did not differ according to sexual orientation.

Consistent with expectation, Table 6.10 indicates that ecstasy users (92%) were also significantly more likely than non-ecstasy users (25%) to have had sex under the influence of substances (*OR* = 33.75, *95% CI*: 10.89 – 104.56) and also to have had unsafe (ecstasy users = 59%, non-users = 18%, *OR* = 6.53, *95% CI*: 2.97 – 14.32) and unintended sex under the influence of substances (ecstasy users = 31%, non-users = 10%, *OR* = 3.87, *95% CI*: 1.55 – 9.71).

6.5.4.3 The Relationship Between Personality and Sexual Risk-Taking According to Ecstasy Use

Based on the differences observed in relation to the personality profile of ecstasy users and non-users, the five ZKPQ-50-CC personality variables were correlated with the total sexual risk-taking scale score for ecstasy users and non-users separately. As demonstrated in Table 6.11, aggression-hostility was the only personality variable that significantly correlated with the overall measure of sexual-risk taking for ecstasy users (r_s = 0.35, $p < .05$). Specifically, as ecstasy users' scores in aggression-hostility increased, so did their level of sexual risk-taking. For non-ecstasy users, sociability was the only personality variable that significantly correlated with a general measure of sexual risk-taking (r_s = 0.23, $p < .05$). Similarly, in those individuals who had never used ecstasy, as their score on the personality measure of sociability increased so too did their level of sexual risk-taking. These findings suggest that the personality variables associated with sexual risk-taking behaviour may be different for ecstasy users and non-users.

Table 6.11

Correlations between ZKPQ-50-CC Personality Variables and Sex Risk Scale According to History of Ecstasy Use

	Ecstasy Users	Non-Ecstasy Users
	n = 49	n = 88
Activity	r_s = .07	r_s = -.01
Aggression-Hostility	r_s = .35*	r_s = .02
Sociability	r_s = -.05	r_s = .23*
Impulsive Sensation-Seeking	r_s = .01	r_s = .19
Neuroticism-Anxiety	r_s = -.14	r_s = .03

*$p < .05$, **$p < .01$, ***$p < .001$

The sexual risk-taking scale scores were also correlated with the measures of social anxiety included in this study. This analysis revealed that for ecstasy users, sexual risk-taking appeared to be unrelated to these measures with no significant correlation identified for either the SIAS or SPS with the sex-risk scale; SIAS (r_s = -.11, p = .47) and SPS (r_s = -.13, p = .36). However, for non-ecstasy users, higher levels of sex risk were associated with lower scores on measures of social interaction anxiety (r_s = -.35, p = .001) and also observational anxiety (r_s = -.28, p = .008).

Each of the sexual risk-taking items comprising the sexual risk-taking scale were then correlated with the ZKPQ-50-CC scales to examine whether specific personality variables were related to specific sexual risk-taking behaviours. Again this analysis was conducted separately for ecstasy users and non-users. T-tests were then conducted to examine potential differences in personality variables for individuals who had engaged in a particular risky sexual behaviour against those who had not.

Significant differences on two measures of personality as measured by the ZKPQ-50-CC (sociability and neuroticism-anxiety) were observed for non-ecstasy users according to specific sexual risk-taking behaviours. Specifically, non-ecstasy users who reported having sex under the influence of substances ($M = 6.18$, $SD = 2.58$) scored significantly higher on the sociability subscale than those who had not ($M = 4.30$, $SD = 2.75$; $t(86) = -2.82$, $p < .01$). Additionally, participants who reported having unintended sex under the influence of substances ($M = 6.78$, $SD = 3.42$) scored higher on the measure of neuroticism-anxiety than those who had not engaged in this form of risk-taking ($M = 4.41$, $SD = 2.67$; $t(86) = -2.46$, $p < .05$).

Based on the observed difference between the broad measure of anxiety (ZKPQ-50-CC neuroticism-anxiety) and unintended sex under influence of substances for non-ecstasy users, follow-up t-tests were also conducted to assess whether engagement in this behaviour varied according to social interaction or observation anxiety. No significant differences were observed between those who had engaged in unintended sex under the influence of substances and those who had not with respect to their scores on the SIAS or SPS.

For ecstasy users, there was a significant difference between those who had used condoms inconsistently with their regular partners and those who had not on the aggression-hostility scale. Those reporting inconsistent condom use ($M = 4.28$, $SD = 2.61$) with a regular partner scored significantly higher on that scale than those who had not ($M = 6.74$, $SD = 2.37$; $t(47) = -3.39$, $p < .01$). Similarly, ecstasy users who had recently had unprotected sex with a one night stand ($M = 7.63$, $SD = 2.00$) also scored significantly higher on the aggression-hostility subscale than those who hadn't engaged in this behaviour ($M = 5.49$, $SD = 2.71$; $t(47) = -2.11$, $p < .05$). The final measure of sexual risk-taking on which participants were differentiated by their scores on aggression-hostility was unsafe sex under the influence of substances. Again, those ecstasy users who had engaged in this form

of sexual risk-taking (M = 6.59, SD = 2.40) were higher on the measure of aggression-hostility than ecstasy users who had not (M = 4.75, SD = 2.83; $t(47) = -2.45, p < .05$).

In contrast to the patterns examined in the non-ecstasy user group and those in the previous study, lower scores on the measure of neuroticism-anxiety were associated with a number of sexual risk-taking behaviours for ecstasy users. Specifically, ecstasy users who reported having a one night stand in the previous six months (M = 3.68, SD = 3.40) were lower on the measure of neuroticism-anxiety than ecstasy users who hadn't engaged in this form of risk-taking (M = 5.73, SD = 2.97; $t(47) = 2.22, p < .05$). Similarly, those ecstasy users who had a one night stand with someone unknown to them (M = 2.90, SD = 3.57) also scored significantly lower on the neuroticism-anxiety subscale than those who had not (M = 5.46, SD = 3.02; $t(47) = 2.31, p < .05$). Ecstasy users were also differentiated by their scores on neuroticism-anxiety according to whether they had recently had sex under the influence of substances. Specifically, those ecstasy users who had engaged in this form of sexual risk-taking (M = 4.64, SD = 3.22) were lower on the measure of neuroticism-anxiety than ecstasy users who had not (M = 8.25, SD = 1.71; $t(5.16) = 3.68, p < .05$)[2].

Again based on the observed difference on scores on the neuroticism-anxiety subscale and certain sex risk behaviours (Having a one night stand; One night stand with an unknown person; Sex under the influence of substances), follow-up t-tests were conducted to assess if engagement in this behaviour varied according to scores on the SIAS and SPS for ecstasy users. No significant differences were detected between ecstasy users who had engaged in these measures of sexual risk-taking with respect to their scores on the SIAS or SPS.

6.6 Discussion

6.6.1 Overview and Summary of Findings

This study examined the relationship between ecstasy use, personality and a number of indices of sexual risk-taking behaviour in a sample of young adults in the ACT, Australia. In addition to testing hypotheses related to ecstasy use, personality and sexual risk-taking, this study was the first to examine the relationship between social anxiety and unsafe sexual behaviour among a (primarily) heterosexual sample of young male and female adults. In one of the central findings of this study, the results provided further support for

[2] T-test was computed by SPSS for unequal variances

the documented association between impulsive and sensation-seeking dimensions of personality and the use of ecstasy. Specifically this study demonstrated that in both males and females increasing scores on a self-report measure of impulsive sensation-seeking predicted the use of ecstasy. In addition, two other personality variables were found to be important in predicting ecstasy use, with a contrasting set of findings for males and females. Firstly, for male participants, increasing scores on a measure reflecting hostility and antisocial tendencies (ZKPQ-50-CC aggression-hostility) were predictive of ecstasy use, while for females, the results indicated that increasing levels of neuroticism (ZKPQ-50-CC neuroticism-anxiety) were related to ecstasy use.

A significant proportion of the sample of young adults participating in this study had engaged in a variety of risky sexual acts in the previous six months. In accordance with existing research, those who reported a history of ecstasy use also demonstrated significantly higher levels of sexual risk-taking when compared to those who had never used ecstasy. These results were based on an examination of differences between ecstasy users and non-users with respect to a general measure of sexual risk-taking and also when analysing a series of specific sexual risk-taking behaviours.

A finding of importance in the current research was that impulsive sensation-seeking traits, which have received the majority of the research focus in the literature to date, were not related to sexual risk-taking for the young adults in this sample whether they used ecstasy or not. The importance of considering aspects of personality outside of impulsive and sensation-seeking domains when examining sexual risk-taking behaviour specifically was supported by these findings. In another key finding of this study, it was observed that the personality correlates of sexual risk-taking were different for ecstasy users and non-ecstasy users. More specifically, increasing levels of aggression-hostility was most strongly related to sexual risk-taking for ecstasy users, whereas higher levels of sociability correlated with sexual risk-taking among non-ecstasy users. The current results failed to replicate the findings reported in the previous study of this thesis, wherein increased levels of neuroticism predicted disinhibited sex among regular ecstasy users. Social anxiety also appeared to be unrelated to sexual risk-taking behaviour among ecstasy users in this study. In a contradictory set of findings for non-ecstasy users, higher levels of neuroticism-anxiety did appear to relate to one form of sexual risk-taking behaviour (unintended sex under the influence of substances), whereas higher levels of social anxiety were associated with lower levels of sexual risk-taking overall for this group.

6.6.2 Personality and Ecstasy Use

The finding that impulsive sensation-seeking personality traits predicted the use of ecstasy for both males and females in the present study was expected, based on the findings of the research conducted to date (Butler & Montgomery, 2004; Dughiero et al., 2001; Moeller & Dougherty, 2002; Morgan, 1998; Parrott et al., 2000). However, the results of this study also add to existing knowledge by demonstrating the potential importance of other dimensions of personality in understanding ecstasy use, which appear to be different for males and females.

First with respect to the findings for males, this study found that male ecstasy users reported higher levels of aggression-hostility (in addition to impulsive sensation-seeking) when compared to non-ecstasy users. In existing research, personality traits relating to the aggression-hostility dimension of Zuckerman and Kuhlman's psychobiological model have been related to other behaviours that place one's wellbeing at risk, such as alcohol dependence (Caspi et al., 1997) and a variety of reckless driving behaviours (Arnett, 1996; Caspi et al., 1997; Zuckerman & Kuhlman, 2000). In results that directly relate to those observed for males in the current study, Zuckerman & Kuhlman (2000) reported that impulsive sensation-seeking predicted involvement in smoking and illicit drug use and both impulsive sensation-seeking and aggression-hostility predicted the frequency and quantity of alcohol use among a sample of college students. It has been argued previously that aspects of personality relating to aggressive tendencies may partially explain the developmental foundation of risk-taking behaviour such as involvement in illicit drug use. These arguments are based on the knowledge that hormones such as testosterone – levels of which are related to the expression of trait aggression (Zuckerman, 2005) – peak at points in development which correspond to increased involvement in many forms of risk-taking behaviour (Arnett, 1996). From a psychobiological perspective, the finding that this aspect of personality relates to ecstasy use for males and not females is consistent with this evidence, given that males have higher levels of testosterone than females (Zuckerman, 2005).

Similarly, an interesting set of findings also emerged when the personality predictors of ecstasy use for females were examined. This study found that those females who reported the use of ecstasy also reported higher levels of negative emotionality and anxiety (i.e. who scored higher on the neuroticism-anxiety subscale). Similar to the role of aggression-hostility in predicting ecstasy use specifically among males, the finding that neuroticism-anxiety was related to ecstasy use for females in particular was not surprising.

Research has consistently shown that females typically score higher on measures of trait anxiety and negative affectivity than males (Aluja et al., 2002; Ball, 1995; Costa Jr et al., 2001; Goma-i-Freixanet et al., 2004; Goma-i-Freixanet et al., 2005; Zuckerman & Kuhlman, 1998, 2000) and this difference was also observed in the current sample. The finding that females who used ecstasy reported both higher levels of negative affect and impulsive sensation-seeking tendencies, also corresponds to research conducted by Vollrath & Torgersen (2002, 2008) who examined the relationship between personality typologies (rather than personality variables in isolation) and risk-taking behaviour. In these studies Vollrath & Torgersen (2008) found that university students who were defined by personality profiles including high levels of neuroticism and low levels of 'constraint' – that is those who demonstrate minimal control over emotional responses and are susceptible to negative emotional experiences – were more prone to involvement in risky health behaviours such as illicit drug use (Vollrath & Torgersen, 2002, 2008).

The finding that females who are more neurotic and anxious are more likely to use ecstasy provide considerable reason for concern, particularly when considered in light of research that suggests females in particular are also more vulnerable to the negative consequences associated with ecstasy use (Liechti et al., 2001; ter Bogt & Engels, 2005). For example, in a series of three studies where males and females were administered equal doses of MDMA per kilo of body weight, Liechti et al. (2001) witnessed that the subjective adverse effects of ecstasy – such as thought disturbances, anxiety and perceptual changes – were more intense in females than males. In addition, a significant correlation between the dose of MDMA and MDMA induced anxiety scores existed for the female but not male participants. In a later study conducted in the Netherlands, ter Bogt & Engels (2005) examined the relationship between motives for and the consequences of ecstasy use. Similar to the observations of Liechti et al. (2001), ter Bogt & Engels (2005) reported that female ecstasy users experienced significantly more (acute) negative effects of ecstasy use than male ecstasy users. In subsequent analyses it was also found that those females who reported stronger coping motives to use ecstasy in particular (i.e. who reported using ecstasy to 'have less worries', 'forget my problems' and 'feel well for just one time') were at higher risk of experiencing a number of negative physical and physiological experiences whilst using ecstasy compared with those who were less focussed on coping motives. Within the motivational framework discussed earlier (Cooper et al., 2000), it is possible that those females in the current sample who experience high levels of negative affect (and those who lack impulse control), use ecstasy as a means to regulate their emotions and provide relief from their aversive mood. In summary, these research findings suggest that

females who use ecstasy as a means of coping with their problems may actually be placing themselves at increased risk for negative physical and psychological experiences associated with the drug's use, and thus only serve to compound their existing problems.

Overall, these results add to an accumulating body of literature which suggests that the personality trait of impulsive sensation-seeking reliably predicts ecstasy use in both males and females. This study also adds to existing knowledge by suggesting that the relationship between personality and ecstasy use may be different for males and females. Future research is needed to replicate the results observed in the present study with larger samples.

6.6.3 Ecstasy Use and Sexual Risk-Taking Behaviour

The literature reviewed earlier in this thesis suggested that although the effects of ecstasy on human sexual functioning are not always positive, this substance is generally related to expectation of enhanced sexual experiences and sexual disinhibition. In previous research examining the relationship between a number of substances and sexual risk-taking behaviour, a history of ecstasy use has consistently been shown to relate to a variety of risky sexual behaviours such as having had multiple sexual partners (Boyd et al., 2003; Strote et al., 2002), earlier age of sexual initiation (Novoa et al., 2005) and unprotected sex (Klitzman et al., 2000; Mattison et al., 2001). The results of the current study add to this research; ecstasy use was associated with a broad measure of sexual risk-taking and in subsequent analyses it was demonstrated that those participants who had used ecstasy were significantly more likely to have engaged in each individual form of sexual risk-taking examined. These findings strengthen and support the results of other studies that have found ecstasy use to be associated with a variety of risky sexual behaviours in samples of American university students (Boyd et al., 2003; Strote et al., 2002), heroin, crack and cocaine users (Novoa et al., 2005) and gay and bisexual males (Choi et al., 2005; Klitzman et al., 2000; Mattison et al., 2001; Waldo et al., 2000).

6.6.4 Personality and Sexual Risk-Taking

Impulsive Sensation-Seeking and Sexual Risk-Taking

To build on the results of the previous study in this thesis, the current study also examined the personality correlates associated with sexual risk-taking for young ecstasy using adults and non-ecstasy using adults. Although scores on the impulsive-sensation seeking scale were found to be important in predicting ecstasy use, this facet of personality was again not associated with risky sexual behaviour for ecstasy users. As noted in Chapter Five, impulsive and sensation-seeking aspects of personality have been associated with

sexual risk-taking in numerous other studies. However, the two studies in this thesis have failed to find an association between impulsive sensation-seeking and sexual risk-taking for ecstasy users or non-ecstasy users. Given that the impulsive and sensation-seeking aspects of personality were found to reliably predict involvement in ecstasy use but not sexual risk-taking, these findings therefore support contemporary theories of personality and risk-taking behaviour wherein different aspects of personality are believed to predict involvement in distinct forms of risk-taking behaviour (Hoyle et al., 2000; Katz et al., 2000). The current study did however find relationships between other personality factors and risky sexual behaviour, with different aspects of personality being related to overall involvement in sexual risk-taking for ecstasy users (aggression-hostility) and non-ecstasy users (sociability).

Personality Correlates of Sexual Risk-Taking for Ecstasy Users

One of the aims of this study was to replicate the previous finding that elevated levels of neuroticism related to risky sexual behaviour (unintended sex) among ecstasy users. This study failed to find a positive association between the measure of neuroticism and sexual risk-taking in general. In a set of findings that directly opposed those of the previous study, lower scores on neuroticism anxiety were associated with involvement in a number of risky sexual behaviours for ecstasy users, including having sex under the influence of substances. Furthermore, for ecstasy users, no relationship was detected between social anxiety and sexual risk-taking.

The results of this study indicated that ecstasy users who scored more highly on aggression-hostility were more prone to involvement in a number of risky sexual behaviours over the past six months. The inspection of individual items in the sex-risk scale revealed that ecstasy users who were higher on the measure of aggression-hostility were less likely to use condoms in a variety of contexts including with regular partners, when having one night stands and also when having sex under the influence of substances. In Costa and McCrae's five factor model of personality, low levels of 'agreeableness' are associated with an antagonistic interpersonal style which in turn most closely relates to aggression-hostility as measured in the ZKPQ-50-CC (Aluja et al., 2006). Although not hypothesised in the current study, previous research has consistently observed a relationship between low levels of agreeableness (and related personality domains) and problematic aspects of sexuality including early sexual initiation (Miller et al., 2004), relationship infidelity (Miller et al., 2004; Schmitt, 2004), having multiple sexual partners (Miller et al., 2004), unprotected sex (Caspi et al., 1997; Trobst et al., 2002) and substance

use during sex (Miller et al., 2004). Similarly, Zuckerman & Kuhlman (2000) found that aggression-hostility (in addition to impulsive sensation-seeking) was strongly associated with sexual risk-taking among a sample of college students. Although this finding was not hypothesised, researchers in the past have established and argued for a link between aggression and sexual risk-taking. Most of these accounts have focussed on the fact that aspects of personality relating to aggression are intrinsic to one's interpersonal style, and sexual behaviour is strongly influenced by interpersonal relationships (Miller et al., 2004). For example, Trobst et al. (2002) argued that safer sex practices, such as the use of condoms, require a degree of negotiation and interpersonal sensitivity which tends to be lacking in those who typically do not trust others or demonstrate a lack of concern for other people. Thus the characteristic distrust and aggression of individuals defined by aggressive personality traits (Miller et al., 2004) may interfere with implementing safe sex behaviours that not only serve to protect others, but also themselves. The observation in this study that, among ecstasy users, higher levels of aggression-hostility were associated with a decreased likelihood of using condoms in a variety of sexual situations, is consistent with this explanation.

Personality Correlates of Sexual Risk-Taking for Non-Ecstasy Users

When examining the personality correlates of sexual risk-taking for young adults who had never used ecstasy, it was found that sociability was positively associated with higher levels of sexual risk-taking. The subsequent inspection of each of the individual sex risk-items found that individuals who had sex under the influence of substances in the past six months scored higher on the measure of sociability than those who had not engaged in this behaviour. The influence of sociability in understanding sexual risk-taking among non-ecstasy users is consistent with other studies that have found personality constructs such as extraversion were linked to promiscuous sexual behaviour (Miller et al., 2004; Pinkerton & Abramson, 1995) and to unsafe sexual practices (Hoyle et al., 2000; McCown, 1991; Miller et al., 2004). These findings are also not unexpected given that individuals high on measures of extraversion or sociability typically demonstrate a preference for social events and social interaction and in addition tend to be socially dominant (Zuckerman, 2005), a quality that may attract potential partners and facilitate opportunities to pursue sexual relations (Miller et al., 2004). In addition, the specific relationship between increased sociability and having sex under the influence of substances observed in this group has been reported in an earlier study. Using Costa and McCrae's five factor model, Miller et al. (2004) related higher levels of extraversion to a number of sexual risk-taking indices including the use of drugs or alcohol prior to sex. When accounting for this finding, Miller

et al. (2004) argued that a level of social engagement in environments where one might meet a potential sexual partner generally enhances one's chance of meeting a potential sexual partner. It follows that being increasingly sociable will tend to place individuals in situations in which both potential partners and alcohol and other substances (such as bars, parties and pubs) are more available (Miller et al., 2004). Again interpreting these findings within the motivational framework discussed earlier, it is possible that individuals who had sex under the influence of substances were motivated by the desire to enhance already (generally) positive affective states.

Turning to the findings relating to neuroticism-anxiety, social anxiety and sexual risk-taking for the non-ecstasy users in this study, a contradictory set of results was observed. Firstly, in a similar set of findings to those reported in the previous study, this study found that among non-ecstasy using adults, those individuals who scored higher on a measure of neuroticism-anxiety were more likely to have had unintended sex under the influence of other substances. No reliable relationship however was established between neuroticism-anxiety and involvement in other sexual risk-taking behaviours. In a follow-up set of analyses, higher scores on measures of social anxiety (both social interactional and observational anxiety) were found to relate to decreased levels of involvement in risky sexual practices over the past six months for young adults who had never used ecstasy. That is, those individuals who were more anxious in social situations and demonstrated stronger fears regarding situations in which they might be observed or scrutinised were less likely to have engaged in sexual risk-taking behaviours. These findings run contrary to the initial hypotheses of this study, which were based on the results of earlier research suggesting a relationship between higher levels of social anxiety and risky sexual behaviour (Hart & Heimberg, 2005; Hingson et al., 1990; Leary & Dobbins, 1983). One possible explanation for these results relates to the particularly high levels of social anxiety observed among participants in this study. A significant proportion of participants reported levels of social interaction and social observation anxiety that are considered to be in clinical ranges, with one fifth (21%) of participants reporting levels of social interaction anxiety in 'high' ranges and almost half (44%) the sample reporting levels of observational anxiety in the 'high' or clinical range. In the past it has been proposed that individuals who are highly socially anxious are more likely to experience anxiety in romantic situations and sexual interactions and, as a consequence, the avoidance of sexual encounters develops as a way of coping (Leary & Dobbins, 1983). Leary & Dobbins (1983) for instance found that males and females who scored higher on a measure of social anxiety reported higher levels of anxiety and apprehension regarding sex and in behavioural terms were less sexually

experienced, reporting fewer sexual partners and also engaging in sex on a less frequent basis. In spite of this, their results simultaneously indicated that when socially anxious females do engage in sexual activity, they are placed at increased risk for the negative consequences associated with sexual behaviour (such as sex without a condom). It is possible, therefore, that the participants in the current study represent the extreme end of the social anxiety spectrum and, rather than using substances to cope with these situations, they simply choose to avoid interpersonal situations as a means of managing their anxiety. Given that these individuals are less likely to be involved in sexual situations, it follows that they also have less opportunity to experience sexual risk. The conflicting results of the analyses regarding the role of anxiety and social anxiety in understanding sexual risk-taking among ecstasy users and non-users in the present study contributes to the already existing ambiguity concerning negative affect and risky sexual behaviour in the literature.

6.6.5 Limitations of the Current Study and Directions for Future Research

The sample reported in this chapter consisted primarily of undergraduate university students and so caution must be taken if generalising these findings beyond a university population. Due to the problems experienced in recruiting an adequate sample of regular ecstasy users for this study, the inclusion criteria for this study were changed. Only a relatively small proportion of participants in the current study had used ecstasy in their lifetime ($n = 49$) and of this group a smaller number still ($n = 36$) had used ecstasy 'regularly' in the past six months. The findings reported for this study require further exploration in a larger and more representative sample that includes a larger proportion of regular ecstasy using participants in particular.

The purpose of the current study was to attempt to identify predictors of sexual risk-taking behaviour for ecstasy users and non-ecstasy users. The lifetime use of ecstasy was associated with increased involvement in sexual risk-taking behaviour over the previous six months in this sample of young adults. One of the major findings reported in this chapter was that increasing levels of impulsivity and sensation-seeking predicted the use of ecstasy for both males and females, with higher levels of aggression-hostility also predicting ecstasy use in males and higher levels of neuroticism-anxiety promoting ecstasy use in females. A key result reported in this research was that although impulsive sensation-seeking predicts sexual risk-taking for many other samples (including other drug using samples) and also reliably predicts the use of ecstasy itself, it did not predict risky sexual behaviour among ecstasy users. These results collectively suggest that in efforts to

understand why individuals engage in risky behaviours such as illicit drug use and unsafe sex, it is important to consider the influence of multiple dimensions of personality.

A primary aim of the current study was to extend on the key finding reported in Chapter Five – that higher levels of neuroticism-anxiety promoted disinhibited sexual behaviour among regular ecstasy users. The current study failed to replicate this finding. The picture that emerged from the examination of anxiety (at both a broad trait level and also situational specific level) and sexual risk-taking behaviour in this research was a contradictory one. No relationship was observed between social anxiety and sexual risk-taking for ecstasy users, whereas in direct contrast to what was hypothesised, higher levels of social anxiety were associated with lower levels of sexual risk-taking for non-ecstasy users. Based on the results reported in this dissertation to date, the reliable predictors of sexual risk-taking among established users of ecstasy therefore appear to be the use of ecstasy itself, and the individual's beliefs regarding the disinhibiting properties of ecstasy.

CHAPTER SEVEN

General Discussion

7.1 Summary of Findings and Implications

The chapters of this thesis provide a review of the literature and the results of a series of studies that examine predictors of sexual risk-taking behaviour among an identified sample of 'high-risk' individuals, regular ecstasy users. The findings reported advocate the use of a framework that considers not only the direct biological effects of ecstasy when examining risky sexual behaviour, but also distinct features of the individuals who engage in this form of risk-taking. Specifically, the results presented in this dissertation support the potential utility of an outcome expectancy framework when attempting to identify those ecstasy users most at risk of unsafe sexual behaviours that occur in the context of ecstasy use. The results of two studies suggest that among a regular ecstasy using population, a particular set of beliefs regarding the effects of ecstasy on human sexual behaviour predicted involvement in risky sexual behaviour that occurred under the influence of ecstasy. Reflecting the conflicting findings reported in the broader literature on personality and sexual risk-taking behaviour, this dissertation also presented a mixed set of findings regarding the role of anxious and neurotic personality traits in understanding risky sexual activity.

7.1.1 Literature Review

Chapter One first highlighted the multitude of potential negative consequences that are associated with risky sexual activity ranging from unplanned pregnancy to the acquisition of an STI and the risk that has demanded the greatest focus so far – the acquisition of HIV. This literature emphasised that both in developed and developing countries the costs associated with unsafe sexual behaviour are significant and sexual risk-taking has been identified as a concerning public health issue worldwide. In spite of increasing awareness and education relating to sexual practices that place individuals at increased risk for experiencing the negative consequences associated with sexual behaviour, however, this chapter reported the worrisome finding that rates of STI and HIV infection continue to increase in Australia. The preliminary evidence reviewed in Chapter One also links the use of substances and in particular ecstasy, with involvement in a number of risky sexual practices.

Chapter Two then provided a review of the established harms, both short and long-term, that are associated with the use of ecstasy. Given the suggested link between ecstasy use and risky sex in the first chapter, Chapter Two focused in detail on the literature that examines the effects of ecstasy on human sexual functioning and behaviour. The evidence presented suggests that in addition to enhancing certain aspects of sexual functioning (such as increasing sexual desire and perceived sexual satisfaction), ecstasy use is also associated with several adverse effects on sexual functioning, including a decrease in sexual desire for some individuals, difficulty achieving orgasm, and erectile problems in males. However, ecstasy use has most commonly overall been related to enhanced sexual experiences and a decrease in sexual inhibitions among users of this substance.

Chapter Three reviewed the varying ways in which sexual risk-taking has been defined in the literature and identified an additional under-researched form of sexual risk-taking – unintended sexual encounters. Also examined in this chapter are the findings of survey research that have established a relationship between the use of alcohol and other substances with sexual risk-taking behaviour. Collectively, the research findings from global association, situational association and event-level analyses intimate that those individuals who drink alcohol (with both increasing frequency and quantity), who use illicit drugs, and who use substances in combination with sexual activity are more likely to engage in risky sexual behaviours. Following on from these findings, Chapter Three then examined one theory that has successfully been used to understand the relationship between substance use and subsequent risky sexual behaviour – outcome expectancy theory. Outcome expectancy theory suggests that sexual behaviour in the context of substance use is, in part, influenced and motivated by expectancies that relate to positive or enhanced experiences when a given substance is consumed. The review of the outcome expectancy literature which to date has focussed on alcohol use, indicates that alcohol-related sexual activity is influenced by a specific set of pre-existing beliefs that individuals hold regarding the (potentially positive) effects of alcohol on sexual behaviour.

7.1.2 Ecstasy Use, Ecstasy Outcome Expectancies and Sexual Risk-Taking

Based on the literature presented above, Chapter Four reported on the results of a study that examined the relationship between ecstasy outcome expectancies (assessed by the EEQ) and disinhibited sexual behaviour related to ecstasy use. Firstly, the findings regarding the recent sexual activity of the regular ecstasy users who participated in this research contributed to increasing evidence that through involvement in unsafe sexual practices, ecstasy users place themselves at considerable physical and psychological risk.

Consistent with prediction, the level of involvement in sexual risk-taking behaviours such as inconsistent condom use, having sex under the influence of drugs and alcohol and with multiple sexual partners, was prominent among the regular ecstasy users recruited for the first two studies of this dissertation. Furthermore, the use of ecstasy was directly linked to involvement in risky sexual practices in these studies by asking participants whether they had engaged in unsafe and unintended sex under the influence of this substance in the preceding six months. These findings were also strengthened by results reported in a later chapter of this thesis (Chapter Six), wherein a subsample of young adults who reported a history of ecstasy use also demonstrated significantly higher levels of sexual risk-taking (in terms of both a general measure of sex risk and also on a specific behavioural level) when compared to young males and females who had never used ecstasy.

The expectancy scale that was associated with all three forms of sexual risk-taking examined in Chapter Four was the Sexual Enhancement subscale. Similar to findings relating to alcohol research, individuals who held stronger expectations that the use of ecstasy resulted in individuals being more likely to have sex, to have casual sex, and to be more comfortable in trying 'different' sexual experiences, were also more likely to have engaged in ecstasy related sexual risk-taking in the previous six months. In addition, the Sexual Decrement scale was also found to have protective effects with regard to having sex under the influence of ecstasy. Ecstasy users who strongly endorsed items reflecting the belief that ecstasy use results in impairment in sexual performance were less likely to have sex under the influence of ecstasy. Furthermore, respondents who did not strongly endorse items reflecting the belief that ecstasy use is associated with depressive mood effects (Negative Mood State subscale) were more likely to have reported unsafe sex specifically under the influence of ecstasy in the past six months.

In the subsequent study of this dissertation (Chapter Five), the Sexual Enhancement subscale was also found to predict all three forms of sexual risk-taking assessed in a logistic regression analysis; having sex under the influence of ecstasy, having unsafe sex under the influence of ecstasy, and having unintended sex under the influence of ecstasy. When considered together, the results of the first two studies in this thesis provide evidence to suggest that, as has been observed for alcohol, outcome expectancies regarding the effects of ecstasy on sexual behaviour are associated with recent participation in ecstasy related sexual risk-taking. These findings are therefore consistent with an outcome expectancy framework suggesting that changes in the sexual behaviour that result from ecstasy use can be partially explained in terms of what an individual expects will occur if

they consume ecstasy. In particular, a strong set of beliefs relating to the disinhibiting properties of ecstasy on sexual behaviour reliably predicted involvement in ecstasy-related sexual risk-taking among regular users of this substance. These findings are important given that the predictive power of ecstasy outcome expectancies were shown to persist after other variables of importance had been considered. For example, heavier or more regular patterns of ecstasy use were found to promote involvement in risky sexual activity whilst under the influence of ecstasy, and in addition, in Chapter Five, stable personality traits were also shown to influence sexual risk-taking behaviour. Attesting to the strength of the expectancy findings however, the influence of ecstasy outcome expectancies – in particular the Sexual Enhancement subscale of the EEQ – still remained after the frequency of ecstasy use itself and enduring aspects of personality were statistically controlled for.

These results therefore have the potential to inform harm minimisation strategies which endeavour to reduce sexual risk-taking behaviours associated with ecstasy use and the subsequent costs of these behaviours. Successful harm minimisation strategies are dependent on the identification of (ideally) modifiable points for intervention. In contrast to demographic and personality variables which are generally less amenable to change, outcome expectancies are potentially modifiable (Goldman et al., 1987; Jones, Corbin, & Fromme, 2001). This set of findings therefore has direct practical application as it provides information regarding a set of beliefs that could be used to differentiate between those ecstasy users who are likely to engage in risky practices whilst under the influence of this drug, and those who are not. The assessment of ecstasy outcome expectancies – in particular those relating to the effects of ecstasy on sexual behaviour and functioning – may therefore assist in identifying individuals who are at increased risk of involvement in unsafe sexual practices when under the influence of this substance. In this way, efforts to modify the sex-related ecstasy expectancies, which the current research has shown to be predictive of risky sexual behaviour among this 'high-risk' group of individuals, may therefore prove valuable.

In relation to intervention strategies that target problematic alcohol use, researchers have proposed that positive outcome expectancies can provide a useful target for reduction and negative outcome expectancies provide a target for enhancement (Jones & McMahon, 1998). In generalising these findings from the alcohol literature, it may be possible to use an expectancy framework when working in the clinical field with individuals who use ecstasy for the purposes of sexual disinhibition. This process may assist these individuals to

develop an alternative set of strategies that allow them to achieve the outcome they are seeking (i.e. being able to relax in romantic or sexual contexts) without the use of ecstasy. At the same time, it could prove useful to highlight the risks associated with the desired disinhibition (i.e. having unprotected sex and thus being placed at increased risk for HIV transmission), and also to raise awareness regarding the identified negative aspects of ecstasy on sexual functioning (i.e inability to achieve orgasm). Campaigns that heighten awareness of the potential for individuals to become sexually disinhibited after ecstasy use and document the risks associated with disinhibition whilst also encouraging safer sex practices (e.g. make sure you always carry condoms with you) may therefore prove beneficial in attempts to minimise the level of sexual risk-taking among users of ecstasy.

7.1.3 Personality, Ecstasy Use and Sexual Risk-Taking

The results of this thesis enhance the current literature by examining a comprehensive model of personality in relation to sexual risk-taking, and therein address one of the major limitations of the personality and sexual risk-taking literature so far. In this dissertation, the relationship between personality (using Zuckerman & Kuhlman's psychobiological model of personality) and sexual risk-taking was explored in a number of ways. A series of analyses were also conducted in an attempt to disentangle the confused relationship between anxiety and sexual risk-taking, by directly examining sexual (as conceptualised by the Sexual Self-Schema construct) and social specific (SIAS and SPS) dimensions of anxiety. Chapter Five first reported on the results of a study that examined the personality predictors of ecstasy related sexual risk-taking among a sample of regular ecstasy users. In the subsequent study (Chapter Six) the relationship between personality and a broad sex-risk construct and its component items was examined in a sample of young adults, including individuals who had used ecstasy and those who had not. As predicted, the personality profile of a sample of young adults who had used ecstasy contrasted with the profile observed for a sample of young adults who had never tried ecstasy, and similarly, the personality predictors of sexual risk-taking also differed between these groups. The key findings for these analyses are discussed below.

Impulsive Sensation-Seeking, Ecstasy Use and Sexual Risk-Taking

Ecstasy users are a population that have been defined by increasing levels of impulsivity and sensation-seeking in the literature and the findings in this dissertation provided additional strong support for this association. In addition to the finding that increasing levels of neuroticism-anxiety predicted ecstasy use for females and aggression-hostility predicted ecstasy use in males, the final study of this thesis (Chapter Six) found

that increasing scores on a self-report measure of impulsive sensation-seeking (as measured by the ZKPQ-50-CC) predicted a history of ecstasy use for both males and females. However contrary to much of the existing literature, impulsive sensation-seeking was not associated with any measure of sexual risk-taking behaviour analysed in this study, for both individuals who had used ecstasy and those who had never tried it. Furthermore, in the preceding chapter, impulsive sensation-seeking was unrelated to each form of sexual risk-taking assessed among a sample of regular ecstasy users. Although these aspects of personality have been associated with sexual risk-taking in numerous other studies including those that have specifically employed other drug using samples, the two studies reported in this thesis found no association between impulsive sensation-seeking and sexual risk-taking behaviour. Furthermore, the finding that impulsive sensation-seeking predicted ecstasy use, but appeared to be unrelated to another form of risk-taking (sexual risk-taking) among ecstasy users (with varying levels of experience with the drug) supports the utility of a multi-dimensional model of risk-taking. These findings indicated that for ecstasy users, the key personality features driving involvement in one form of risk-taking do not necessarily predict involvement in another form of risk-taking.

In Hoyle et al.'s (2000) review, they argued that research which aims to explore the influence of impulsive and sensation-seeking aspects of personality on sexual risk-taking is best informed by Zuckerman and Kuhlman's psychobiological model, which was the measure employed in the current research. The possibility exists that the measures of sexual risk-taking utilised in this dissertation were not sensitive enough to capture the relationship between impulsive sensation-seeking and risky sexual behaviour. However, statistical associations were observed between other dimensions of personality and the sex risk variables employed. These results therefore need to be confirmed in future studies that employ larger samples of regular ecstasy users.

Neuroticism-Anxiety and Sexual Risk-Taking Behaviour

The findings of this thesis are consistent with the existing ambiguity regarding the relationship between neurotic personality domains and risky sexual behaviour. A contradictory set of findings was observed when examining the relationship between neuroticism-anxiety and sexual risk-taking among young adults who use the drug ecstasy. The key finding of Chapter Five was that, among a sample of regular ecstasy users, increasing levels of trait neuroticism-anxiety related to unprotected sex, and neuroticism-anxiety was the lone personality predictor of unintended sex related to ecstasy use. In the final study of this thesis, higher levels of neuroticism-anxiety also appeared to relate to

substance-related unintended sexual encounters for non-ecstasy users. In the same study however, this relationship was not replicated for the ecstasy using population. In fact, lower levels of neuroticism-anxiety were associated with sexual risk-taking behaviours for the ecstasy users in the sample, including having a one-night stand and having sex under the influence of substances.

The potential significance of the relationship between increasing levels of neuroticism and having had unintended sex observed in Chapter Five may be influenced by the outcome expectancy findings reported in this thesis. That is, those individuals who held a set of beliefs regarding the disinhibiting effects of ecstasy on sexual behaviour were more likely to report having had unintended sex under the influence of ecstasy. Some researchers have posited that the use of substances and the role of substance-related outcome expectancies may be most pertinent in the formative stages of a sexual relationship (J. Brown & Vanable, 2007; Corbin & Fromme, 2002; Dermen & Cooper, 2000). Research findings supporting this theory for alcohol use, have shown that alcohol use leads to decreased condom use for individuals with strong positive outcome expectancies regarding the effects of alcohol on sex, in initial or 'casual' sexual encounters (J. Brown & Vanable, 2007; Corbin & Fromme, 2002; Dermen & Cooper, 2000). To the extent that an individual who experiences higher levels of anxiety generally may use ecstasy to disinhibit or relax them in the early stages particularly of a romantic relationship, it is possible that the relationship between neuroticism-anxiety and risky sexual behaviour would be more pronounced in sexual episodes involving relatively new or unknown partners than those in enduring relationships. Future research in the area of ecstasy use and sexual risk-taking may therefore benefit from asking specifically about the use of ecstasy when establishing new relationships or in first time sexual encounters.

In addition to exploring the influence of ecstasy use and broad personality domains on sexual risk-taking, this study was the first to examine the relationship between measures of social anxiety and unsafe sexual behaviour among a heterosexual sample of young male and female adults. Although a relationship was observed between the measure of trait anxiety and sexual risk-taking in Chapter Five, no reliable association was observed between a measure of sexual specific anxiety (sexual self-schema) and risky sex, and in the subsequent study, no association was observed between social anxiety and sexual risk-taking for ecstasy users. For non-ecstasy users however, higher levels of both forms of social anxiety assessed (social interaction and observation anxiety) were associated with

lower levels of involvement in sexual activity in general, and also sexual risk-taking specifically.

When the personality findings are taken together, the results of this dissertation emphasise the complex influence of personality traits on risky sexual behaviour. Firstly, for regular ecstasy users – a group characterised by a high level of involvement in behaviours that jeopardise their physical and psychological well-being – the personality variables that predicted their drug use were shown to differ from those personality variables that predicted their involvement in risky sexual activity. Furthermore in Chapter Six, the personality predictors of sexual risk-taking were shown to vary for ecstasy users and non-ecstasy users and the analysis of individual measures of sexual risk-taking revealed that specific sexual behaviours also had unique personality correlates. Considered collectively, these findings emphasise the importance of considering the role of contrasting domains of personality when attempting to understand sexual risk-taking behaviour.

7.2 Limitations and Conclusions

The interpretations of the results reported in this dissertation are limited in a number of ways. Firstly, the research conducted in this thesis relied solely on self-reports of behaviour and the accuracy of these retrospective reports cannot be determined. Relevant reviews of the literature however indicate that self-report measures of sexual behaviour appear to be valid (Catania, Gibson, Chitwood, & Coates, 1990), although the possibility that self-report bias contributed to the obtained results cannot be dismissed (Cooper et al., 1998).

The results of the two studies in this dissertation that focus on examining the predictors of sexual risk-taking for regular ecstasy users may not generalise to ecstasy users in the general population. However, based on the observation that this is a group characterised by a high level of involvement in sexual risk-taking behaviour and are thus in need of intervention, the focus on this sample is warranted. Due to recruitment difficulties in the final study (Chapter Six) only a small sample of regular ecstasy users was obtained, which may have limited the statistical power to detect relationships between the variables in this study.

The cross-sectional design utilised in each of the three studies reported in this dissertation also poses certain methodological issues. Due to this design, these findings

present a somewhat ambiguous ordering of the association between ecstasy outcome expectancies, personality, and risky sexual behaviour. In future studies, examining the potential impact of personality and cognitive variables on sexual risk-taking, a longitudinal design employing three stages of assessment would allow for a temporal order among these variables to be established. With respect to the role of personality in predicting sexual risk-taking behaviour for a regular ecstasy using population, the results at this stage are inconclusive and require further examination with larger samples of regular ecstasy users. Future research in this domain would benefit from attempts to identify the various functions that engaging in risky sexual behaviour may serve for this population, with subsequent testing of models that link personality traits to unsafe sex through motivational pathways.

In regard to the outcome expectancy findings, the results reported in this thesis can also be strengthened through the use of longitudinal research. The prospective assessment of ecstasy outcome expectancies would allow researchers to clearly delineate the ways in which these expectancies may be associated with, and where appropriate maintain, sexual risk-taking behaviour. Regardless of causal issues, this study identified a set of beliefs regarding the effects of ecstasy on human sexual behaviour that were reliably associated with sexual risk-taking under the influence of this drug. Future studies on ecstasy outcome expectancies may need to investigate the utility of attempting to modify these expectancies, so that their potential in strategies to reduce the frequency of sexual risk-taking in this population can be established.

These limitations not withstanding, the findings reported in this thesis contribute to an enhanced understanding of the variables that predict ecstasy related sexual risk-taking behaviour among regular users of this drug. The results of the studies reported in this thesis are consistent with the conclusion that multiple factors are responsible for sexual risk-taking behaviour among ecstasy users. In summary, the findings of this thesis demonstrate that, in particular, heavier patterns of ecstasy use and beliefs regarding the effects of ecstasy on human sexual behaviour, make an individual more prone to involvement in risky sex under the influence of ecstasy.

APPENDIX A

A.1 Ecstasy Expectancy Questionnaire (EEQ) (Scoda, 2002)

Set out below are a number of things that people believe happen to them (or other people) when they take ecstasy. Please circle a number to show how strongly you agree or disagree with the following statements.

1. People are friendlier with each other when they use ecstasy.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

2. When people use ecstasy their sexual performance is not very good.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

3. Ecstasy can help people feel less anxious.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

4. Ecstasy can make people feel a sense of hopelessness.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

5. Ecstasy helps people mellow out.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

6. People are more sensitive to others when they use ecstasy.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

7. Ecstasy can make people feel blue.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

8. People find it easier to talk to each other when they use ecstasy.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

9. Ecstasy can make people's responses slower.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

10. Ecstasy makes people feel warm with each other.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

11. People are more likely to have casual sex when using ecstasy.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

12. Ecstasy helps people get rid of unpleasant thoughts.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

13. Ecstasy can make people clumsy.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

14. Ecstasy helps people express themselves.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

15. People are more daring when they take ecstasy.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

16. Ecstasy helps people tune into music better.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

17. People who use ecstasy lose their sexual urge.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

18. Ecstasy helps people forget about their personal problems.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

19. Ecstasy makes people see or hear things that aren't there.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

20. Using ecstasy makes people worse lovers.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

21. When people use ecstasy it is more difficult for them to plan things.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

22. People loosen up when they take ecstasy.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

23. When people take ecstasy they are less likely to satisfy their partners sexual needs.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

24. Ecstasy takes away any bad feelings people may have.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

25. Ecstasy can make it harder for people to concentrate on things.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

26. Ecstasy can make people feel suicidal.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

27. It is easier for people to relax when they use ecstasy.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

28. People like to take risks when they take ecstasy.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

29. When people use ecstasy they can't always tell what's real.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

30. Ecstasy can help people feel more comfortable trying different sexual experiences.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

31. Ecstasy helps people feel more at ease.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

32. Ecstasy can make people feel low.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

33. People are more likely to have sex when they take ecstasy.

(Strongly Disagree) 0 1 2 3 4 5 6 7 (Strongly Agree)

A.2 Sexual Risk-Taking Questions

1. In the past **six months**, have you had unsafe sex after taking ecstasy?

No 0

Yes 1

2. In the past six months, have you had sex when you hadn't intended to under the influence of party drugs?

No 0

Yes ..... 1 **(Go to 2a)**

2a. Please specify all drugs that you have had unintended sex under the influence of in the last **six months** (mark all that apply):

Ecstasy	1
Methamphetamine powder (speed/goey/whiz)	2
Methamphetamine base (paste/pure).....	3
Crystal methamphetamine (ice/shabu)	4
Cocaine	5
LSD	6
MDA	7
Ketamine	8
GHB (GBH/liquid e/fantasy)	9
1,4B.....	9a
GBL.....	9b
Amyl nitrite	10
Nitrous oxide	11
Cannabis	12
Alcohol.....	13
Heroin	14
Methadone.....	15
Other opiates	16
Benzodiazepines	17
Other.....	18

(specify_____)

APPENDIX B

B.1 Male Sexual Self-Schema Scale (Anderson et al., 1999)

DESCRIBE YOURSELF

Directions: Below is a listing of 45 trait adjectives. For each word, consider whether or not the term describes you. Each adjective is to be rated on a 7-point scale ranging from 0 (= *not at all descriptive of me*) to 6 (= *very much descriptive of me*). Choose a number for each adjective to indicate how accurately the adjective describes you. There are no right or wrong answers. Please be thoughtful and honest.

Question: To what extent does the term _____ describe me?

Not at all descriptive of me	0	1	2	3	4	5	6	Very much descriptive of me

1. humorous	___	16. open-minded	___	31. sensitive	___
2. conservative	___	17. sloppy	___	32. responsible	___
3. smart	___	18. feeling	___	33. reserved	___
4. soft-hearted	___	19. arousable	___	34. experienced	___
5. unpleasant	___	20. rude	___	35. good natured	___
6. powerful	___	21. broad-minded	___	36. romantic	___
7. spontaneous	___	22. passionate	___	37. shy	___
8. shallow	___	23. wise	___	38. compassionate	___
9. independent	___	24. aggressive	___	39. liberal	___
10. inexperienced	___	25. polite	___	40. kind	___
11. domineering	___	26. revealing	___	41. individualistic	___
12. healthy	___	27. warm-hearted	___	42. sensual	___
13. loving	___	28. stingy	___	43. outspoken	___
14. helpful	___	29. exciting	___	44. lazy	___
15. passive	___	30. direct	___	45. excitable	___

B.2 Female Sexual Self-Schema Scale (Anderson & Cyranowski, 1994)

DESCRIBE YOURSELF

Directions: Below is a listing of 50 trait adjectives. For each word, consider whether or not the term describes you. Each adjective is to be rated on a 7-point scale ranging from 0 (= *not at all descriptive of me*) to 6 (= *very much descriptive of me*). Choose a number for each adjective to indicate how accurately the adjective describes you. There are no right or wrong answers. Please be thoughtful and honest.

Question: To what extent does the term _____ describe me?

Not at all descriptive of me	0	1	2	3	4	5	6	Very much descriptive of me

1.	generous	___	26.	disagreeable	___
2.	uninhibited	___	27.	serious	___
3.	cautious	___	28.	prudent	___
4.	helpful	___	29.	humorous	___
5.	loving	___	30.	sensible	___
6.	open-minded	___	31.	embarrassed	___
7.	shallow	___	32.	outspoken	___
8.	timid	___	33.	level-headed	___
9.	frank	___	34.	responsible	___
10.	clean-cut	___	35.	romantic	___
11.	stimulating	___	36.	polite	___
12.	unpleasant	___	37.	sympathetic	___
13.	experienced	___	38.	conservative	___
14.	short-tempered	___	39.	passionate	___
15.	irresponsible	___	40.	wise	___
16.	direct	___	41.	inexperienced	___
17.	logical	___	42.	stingy	___
18.	broad-minded	___	43.	superficial	___
19.	kind	___	44.	warm	___
20.	arousable	___	45.	unromantic	___
21.	practical	___	46.	good-natured	___
22.	self-conscious	___	47.	rude	___
23.	dull	___	48.	revealing	___
24.	straight-forward	___	49.	bossy	___
25.	casual	___	50.	feeling	___

B.3 Zuckerman Kuhlman Personality Questionnaire (ZKPQ) (Zuckerman et al., 1993)

Instructions: On the following pages you will find a series of statements that persons might use to describe themselves. Read each statement and decide whether or not it describes you.

If you agree with a statement or decide that it describes you answer **TRUE** by circling the letter **T**. If you disagree with a statement or feel that it is not descriptive of you, answer **FALSE** by circling the letter **F**.

T = TRUE F= FALSE

Answer every statement either True (T) or False (F) even if you are not entirely sure of your answer.

1	I tend to begin a new job without much planning on how I will do it.	T	F
2	I do not worry about unimportant things.	T	F
3	I enjoy seeing someone I don't care for humiliated before other people.	T	F
4	I never met a person that I didn't like.	T	F
5	I do not like to waste time just sitting around and relaxing.	T	F
6	I usually think about what I am going to do before doing it.	T	F
7	I am not very confident about myself or my abilities.	T	F
8	When I get mad, I say ugly things.	T	F
9	I tend to start conversations at parties.	T	F
10	I have always told the truth.	T	F
11	It's natural for me to curse when I am mad.	T	F
12	I do not mind going out alone and usually prefer it to being out in a large group.	T	F
13	I lead a busier life than most people.	T	F
14	I often do things on impulse.	T	F
15	I often feel restless for no apparent reason.	T	F
16	I almost never litter the streets.	T	F
17	I would not mind being alone in a place for some days without any human contact.	T	F

18	I like complicated jobs that require a lot of effort and concentration.	T	F
19	I very seldom spend much time on the details of planning ahead.	T	F
20	I sometimes feel edgy and tense.	T	F
21	I almost never feel like I would like to hit someone.	T	F
22	I spend as much time with my friends as I can.	T	F
23	I do not have a great deal of energy for life's more demanding tasks.	T	F
24	I like to have new and exciting experiences and sensations even if they are a little frightening.	T	F
25	My body often feels all tightened up for no apparent reason.	T	F
26	I always win at games.	T	F
27	I often find myself being "the life of the party".	T	F
28	I like a challenging task much more than a routine one.	T	F
29	Before I begin a complicated job, I make careful plans.	T	F
30	I frequently get emotionally upset.	T	F
31	If someone offends me, I just try not to think about it.	T	F
32	I have never been bored.	T	F
33	I like to be doing things all of the time.	T	F
34	I would like to take off on a trip with no preplanned or definite routes or timetables.	T	F
35	I tend to be oversensitive and easily hurt by thoughtless remarks and actions of others.	T	F
36	In many stores you just cannot get served unless you push yourself in front of other people.	T	F
37	I do not need a large number of casual friends.	T	F
38	I can enjoy myself just lying around and not doing anything active.	T	F
39	I enjoy getting into new situations where you can't predict how things will turn out.	T	F
40	I never get lost, even in unfamiliar places.	T	F
41	I am easily frightened.	T	F
42	If people annoy me I do not hesitate to tell them so.	T	F
43	I tend to be uncomfortable at big parties.	T	F

44	I do not feel the need to be doing things all of the time.	T	F
45	I like doing things just for the thrill of it.	T	F
46	I sometimes feel panicky.	T	F
47	When I am angry with people I do not try to hide it from them.	T	F
48	At parties, I enjoy mingling with many people whether I already know them or not.	T	F
49	I would like a job that provided a maximum of leisure time.	T	F
50	I tend to change interests frequently.	T	F
51	I often think people I meet are better than I am.	T	F
52	I never get annoyed when people cut ahead of me in line.	T	F
53	I tend to start my social weekends on Thursdays.	T	F
54	I usually seem to be in a hurry.	T	F
55	I sometimes like to do things that are a little frightening.	T	F
56	Sometimes when emotionally upset, I suddenly feel as if my legs are unsteady.	T	F
57	I generally do not use strong curse words even when I am angry.	T	F
58	I would rather "hang out" with friends rather than work on something by myself.	T	F
59	When on vacation I like to engage in active sports rather than just lie around.	T	F
60	I'll try anything once.	T	F
61	I often feel unsure of myself.	T	F
62	I can easily forgive people who have insulted me or hurt my feelings.	T	F
63	I would not mind being socially isolated in some place for some period of time.	T	F
64	I like to wear myself out with hard work or exercise.	T	F
65	I would like the kind of life where one is on the move and traveling a lot, with lots of change and excitement.	T	F
66	I often worry about things that other people think are unimportant.	T	F
67	When people disagree with me I cannot help getting into an argument with them.	T	F

68	Generally, I like to be alone so I can do things I want to do without social distractions.	T	F
69	I never have any trouble understanding anything I read the first time I read it.	T	F
70	I sometimes do "crazy" things just for fun.	T	F
71	I often have trouble trying to make choices.	T	F
72	I have a very strong temper.	T	F
73	I have never lost anything.	T	F
74	I like to be active as soon as I wake up in the morning.	T	F
75	I like to explore a strange city or section of town by myself, even if it means getting lost.	T	F
76	My muscles are so tense that l feel tired much of the time.	T	F
77	I can't help being a little rude to people I do not like.	T	F
78	I am a very sociable person.	T	F
79	I prefer friends who are excitingly unpredictable.	T	F
80	I often feel like crying sometimes without a reason.	T	F
81	No matter how hot or cold it gets, I am always quite comfortable.	T	F
82	I need to feel that I am a vital part of a group.	T	F
83	I like to keep busy all the time.	T	F
84	I often get so carried away by new and exciting things and ideas that I never think of possible complications.	T	F
85	I don't let a lot of trivial things irritate me.	T	F
86	I am always patient with others even when they are irritating.	T	F
87	I usually prefer to do things alone.	T	F
88	I can enjoy routine activities that do not require much concentration or effort.	T	F
89	I am an impulsive person.	T	F
90	I often feel uncomfortable and ill at ease for no real reason.	T	F
91	I often quarrel with others.	T	F
92	I probably spend more time than I should socializing with friends.	T	F
93	It doesn't bother me if someone takes advantage of me.	T	F
94	When I do things, I do them with lots of energy.	T	F
95	I like "wild" uninhibited parties.	T	F

96	After buying something I often worry about having made the wrong choice.	T	F
97	When people shout at me, I shout back.	T	F
98	I have more friends than most people do.	T	F
99	Other people often urge me to "take it easy".	T	F

APPENDIX C

C.1 Zuckerman Kuhlman Personality Questionnaire: 50-Item Cross-Cultural Version (ZKPQ-50-CC) (Aluja et al., 2006)

Instructions: On the following pages you will find a series of statements that persons might use to describe themselves. Read each statement and decide whether or not it describes you.

If you agree with a statement or decide that it describes you answer **TRUE** by circling the letter **T**. If you disagree with a statement or feel that it is not descriptive of you, answer **FALSE** by circling the letter **F**.

T = TRUE F= FALSE

Answer every statement either True (T) or False (F) even if you are not entirely sure of your answer.

1	I do not like to waste time just sitting around and relaxing.	T	F
2	When I get mad, I say ugly things.	T	F
3	It's natural for me to curse when I am mad.	T	F
4	I do not mind going out alone and usually prefer it to being out in a large group.	T	F
5	I lead a busier life than most people.	T	F
6	I often do things on impulse.	T	F
7	I almost never feel like I would like to hit someone.	T	F
8	I spend as much time with my friends as I can.	T	F
9	My body often feels all tightened up for no apparent reason.	T	F
10	I frequently get emotionally upset.	T	F
11	If someone offends me, I just try not to think about it.	T	F
12	I like to be doing things all of the time.	T	F
13	I would like to take off on a trip with no preplanned or definite routes or timetables.	T	F
14	I tend to be oversensitive and easily hurt by thoughtless remarks and actions of others.	T	F
15	I do not need a large number of casual friends.	T	F
16	I can enjoy myself just lying around and not doing anything active.	T	F
17	I enjoy getting into new situations where you can't predict how things will turn out.	T	F

18	I am easily frightened.	T	F
19	If people annoy me I do not hesitate to tell them so.	T	F
20	I tend to be uncomfortable at big parties.	T	F
21	I do not feel the need to be doing things all of the time.	T	F
22	I sometimes feel panicky.	T	F
23	At parties, I enjoy mingling with many people whether I already know them or not.	T	F
24	I sometimes like to do things that are a little frightening.	T	F
25	When on vacation I like to engage in active sports rather than just lie around.	T	F
26	I'll try anything once.	T	F
27	I often feel unsure of myself.	T	F
28	I would not mind being socially isolated in some place for some period of time.	T	F
29	I like to wear myself out with hard work or exercise.	T	F
30	I would like the kind of life where one is on the move and traveling a lot, with lots of change and excitement.	T	F
31	I often worry about things that other people think are unimportant.	T	F
32	When people disagree with me I cannot help getting into an argument with them.	T	F
33	Generally, I like to be alone so I can do things I want to do without social distractions.	T	F
34	I sometimes do "crazy" things just for fun.	T	F
35	I have a very strong temper.	T	F
36	I like to be active as soon as I wake up in the morning.	T	F
37	I can't help being a little rude to people I do not like.	T	F
38	I am a very sociable person.	T	F
39	I prefer friends who are excitingly unpredictable.	T	F
40	I often feel like crying sometimes without a reason.	T	F
41	I like to keep busy all the time.	T	F
42	I often get so carried away by new and exciting things and ideas that I never think of possible complications.	T	F
43	I don't let a lot of trivial things irritate me.	T	F
44	I am always patient with others even when they are irritating.	T	F
45	I usually prefer to do things alone.	T	F

46	I often feel uncomfortable and ill at ease for no real reason.	T	F
47	I probably spend more time than I should socialising with friends.	T	F
48	When I do things, I do them with lots of energy.	T	F
49	I like "wild" uninhibited parties.	T	F
50	When people shout at me, I shout back.	T	F

C.2 Social Interaction Anxiety Scale (SIAS) (Mattick & Clarke, 1998)

For each question, please circle a number to indicate the degree to which you feel the statement is characteristic or true of you. The rating scale is as follows:

0 = Not at all characteristic or true of me
1 = Slightly characteristic or true of me
2 = Moderately characteristic or true of me
3 = Very characteristic or true of me
4 = Extremely characteristic or true of me

	Not at all	Slightly	Moder-ately	Very	Extremely
1. I get nervous if I have to speak to someone in authority (teacher, boss).	0	1	2	3	4
2. I have difficulty making eye contact with others.	0	1	2	3	4
3. I become tense if I have to talk about myself or my feelings.	0	1	2	3	4
4. I find it difficult mixing comfortably with the people I work with.	0	1	2	3	4
5. I find it easy to make friends of my own age.	0	1	2	3	4
6. I tense up if I meet an acquaintance in the street.	0	1	2	3	4
7. When mixing socially, I am uncomfortable.	0	1	2	3	4
8. I feel tense if I am alone with just one person.	0	1	2	3	4
9. I am at ease meeting people at parties, etc.	0	1	2	3	4

	Not at all	Slightly	Moder-ately	Very	Extremely
10. I have difficulty talking with other people.	0	1	2	3	4
11. I find it easy to think of things to talk about.	0	1	2	3	4
12. I worry about expressing myself in case I appear awkward.	0	1	2	3	4
13. I find it difficult to disagree with another's point of view.	0	1	2	3	4
14. I have difficulty talking to attractive persons of the opposite sex *(please note that if you identify as homosexual, then this question refers to members of the same sex)*	0	1	2	3	4
15. I find myself worrying that I won't know what to say in social situations.	0	1	2	3	4
16. I am nervous mixing with people I don't know well.	0	1	2	3	4
17. I feel I'll say something embarrassing when talking.	0	1	2	3	4
18. When mixing in a group I find myself worrying I will be ignored.	0	1	2	3	4
19. I am tense mixing in a group.	0	1	2	3	4
20. I am unsure whether to greet someone I know only slightly.	0	1	2	3	4

C.3 Social Phobia Scale (SPS) (Mattick & Clarke, 1998)

For each question, please circle a number to indicate the degree to which you feel the statement is characteristic or true of you. The rating scale is as follows:

0 = Not at all characteristic or true of me
1 = Slightly characteristic or true of me
2 = Moderately characteristic or true of me
3 = Very characteristic or true of me
4 = Extremely characteristic or true of me

	Not at all	**Slightly**	**Moder-ately**	**Very**	**Extremely**
1. I become anxious if I have to write in front of other people.	0	1	2	3	4
2. I become self-conscious when using public toilets.	0	1	2	3	4
3. I can suddenly become aware of my own voice and of others listening to me.	0	1	2	3	4
4. I get nervous that people are staring at me as I walk down the street.	0	1	2	3	4
5. I fear I may blush when I am with others.	0	1	2	3	4
6. I feel self-conscious if I have to enter a room where others are already seated.	0	1	2	3	4
7. I worry about shaking or trembling when I'm watched by other people.	0	1	2	3	4
8. I would get tense if I had to sit facing people on a bus or a train.	0	1	2	3	4

	Not at all	Slightly	Mode-rately	Very	Extremely
9. I get panicky that other might see me faint, or get sick or ill.	0	1	2	3	4
10. I would find it difficult to drink something if in a group of people.	0	1	2	3	4
11. It would make me feel self-conscious to eat in front of a stranger at a restaurant.	0	1	2	3	4
12. I am worried people will think my behaviour odd.	0	1	2	3	4
13. I would get tense if I had to carry a tray across a crowded cafeteria.	0	1	2	3	4
14. I worry I'll lose control of myself in front of other people.	0	1	2	3	4
15. I worry I might do something to attract the attention of other people.	0	1	2	3	4
16. When in an elevator, I am tense if people look at me.	0	1	2	3	4
17. I can feel conspicuous standing in a line.	0	1	2	3	4
18. I can get tense when speaking in front of other people.	0	1	2	3	4
19. I worry my head will shake or nod in front of others.	0	1	2	3	4
20. I feel awkward and tense if I know people are watching me.	0	1	2	3	4

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