EXPLORING EXPERIENCES OF SUBSTANCE USE IN BIPOLAR DISORDER:

A Q METHODOLOGICAL DESIGN

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Contents

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List of abbreviations

BD = Bipolar disorder

SUD = Substance use disorder

SCID = Structured clinical interview for DSM-IV disorders

PTSD = Post traumatic stress disorder

PD = Personality disorder

QOL = Quality of life

MDD = Major depressive disorder

PCA = Principal component analysis

MPS = Most problematic substance

SURG = Service user reference group

RCT = Randomised controlled trial

CBT = Cognitive behavioural therapy

ISS = Internal state scale

PHQ 9 = Patient Health Questionnaire 9

HDRS = Hamilton depression rating scale

MAS = Bech-Rafaelsen mania rating scale

Abstract

Background: There is a high level of substance use disorder (SUD) in individuals with bipolar disorder (BD). Substance use may have profound effects on the course and outcome of BD however to date the reason for this common co-occurrence is unclear.

Aims: To examine the substance use experiences of individuals with BD with particular emphasis on the self reported reasons for, and after-effects of use.

Method: Q methodology was employed to explore substance use experiences. A pool of substance use experiences was derived from three sources: a literature search of self reported reasons for use studies; a set of semi-structured interviews carried out for a qualitative study exploring reasons for substance use in BD (Healy, Peters, Kinderman, McCracken & Morriss, 2009), and therapy tapes from a pilot study of integrated psychological treatment for substance use in BD (Jones et al, in press). This pool was divided into two sets of experiences: reasons for, and after-effects of substance use. Individuals with BD (n = 50) and current alcohol and/or cannabis use were asked to complete the two Q sorts. Participants were recruited from mental health services and support groups in the North West of England.

Results: Analysis of reasons for use revealed two distinct groups of substance users: those who used substances predominantly in relation to mood regulation and those who used substances socially. Analysis of the after-effects sort revealed three distinct groups of experiences: those who reported mainly positive after-effects of substance use, those who reported mainly negative after-effects of substance use and those who endorsed after-effects in relation with feeling high or intoxicated.

Conclusions: Individuals with BD report idiosyncratic experiences of substance use; a subgroup of individuals appear to report use in direct relation to symptoms of BD. The establishment of subgroups of individuals reporting differences in reasons for and after-effects of substance use may be relevant in designing therapeutic interventions to support the reduction of substance use in this clinical group.

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The Author

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CHAPTER 1:

Introduction

1. Introduction

The main aim of this study was to examine the experiences of substance use self reported by individuals with bipolar disorder (BD), with the intention that a better understanding of reasons for, and after-effects of substance use will contribute towards an explanation for the high co-occurrence of substance use disorder (SUD) reported in BD (Regier et al., 1990).

The following introduction offers a brief summary of prevalence, correlates and outcomes for co-occurring SUD in BD. In order to make comparisons with other groups, this chapter includes an overview of research relating to self reported reasons for substance use in other groups, including non-clinical samples, and those with substance use co-occurring with other disorders such as psychosis, major depression and anxiety disorders.

Next, an overview of the four main hypotheses relating to high levels of SUD in individuals with BD is presented followed by a systematic review of studies investigating self reported reasons for use by this client group.

1.1 Bipolar disorder: An overview

Bipolar disorder is the term used to describe a chronic affective disorder including extreme fluctuations of mood ranging from severe depression to hypomania and/or mania.

Recent prevalence studies employing structured diagnostic interviews in the US report rates of BD I at 1% of the general population, and rates of BD II at 1.2% (Merikangas et al., 2007). Similar rates are reported in European studies (Pini, de Queiroz, Pagnin & Pezawas, 2005). For individuals diagnosed with BD, rates of relapse into mood episode are reported at around 50% within one year (Gitlin, Swendsen, Heller & Hammen, 1995) and 70% within 4 years (Tohen, Waternaux, Tsuang, 1990). The recurrent nature of the disorder causes significant economic burden to individuals, families and society through direct and indirect healthcare costs alone (Kleinman et al., 2003).

Diagnostic criteria for BD are found in the Diagnostic and Statistical Manual, 4th edition (DSM-IV; American Psychiatric Association, 2000). For research purposes, the accepted method of diagnosis is by use of the Structured Clinical Interview for the DSM-IV (SCID; First, Spitzer, Gibbon & Williams, 1997). The following sections provide an overview of the diagnostic criteria concerned with BD, including that for depressed, manic and hypomanic episodes.

1.1.1 Mania

According to the DSM-IV (APA, 2000), diagnosis of a manic episode requires a period of elevated or irritable mood lasting at least one week in duration, or requiring hospitalisation. Further symptoms may include: Inflated self-esteem or grandiosity, decreased need for sleep, pressure

of speech, flight of ideas or racing thoughts, distractibility, an increase in goal-directed activity and excessive involvement in pleasurable activities which have potential to cause harm (APA, 2000). In order to meet full criteria for mania, an individual must experience at least three of the listed symptoms for elevated mood, or four for irritable mood. These symptoms must also cause marked impairment or require hospital admission. For a full description of DSM-IV criteria for manic episodes, see table 1.1, appendix 1.

1.1.2 Hypomania

A hypomanic episode is diagnosed if an individual reports similar symptoms to that of a manic episode, however may cause less impairment of functioning and does not require hospitalisation. Diagnosis of a hypomanic episode according to DSM-IV requires an individual to experience at least four days of elevated or irritable mood, including at least three of the following symptoms if mood is elevated, and four if mood is irritable: Inflated self-esteem or grandiosity, decreased need for sleep, pressure of speech, flight of ideas or racing thoughts, distractibility, an increase in goal-directed activity or psychomotor agitation or excessive involvement in pleasurable activities which have a high potential for painful consequences. These symptoms must cause a change in an individual's non symptomatic character and be observable by others (APA, 2000). See table 1.2, appendix 1 for full diagnostic criteria.

1.1.3 Depression

In accordance with DSM-IV, in order to meet criteria for a depressive episode, an individual must display either depressed mood or a loss of interest in activities they would normally enjoy, daily for a period of at least two weeks. Further to one of these core criteria, diagnosis of a depressive episode requires evidence of at least five of the following: weight loss or weight gain, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or loss of energy, feelings of worthlessness or excessive or inappropriate guilt, recurrent thoughts of death, suicidal ideation or a suicide plan or attempt. Once again, these symptoms should cause significant impairment or distress in order for full criteria to be met. See table 1.3, appendix 1 for full diagnostic criteria.

1.1.4 Diagnosis

DSM-IV provides diagnostic criteria for four sub-types of BD. These include BD I, BD II, cyclothymia and BD not otherwise specified (BD NOS). This thesis is concerned with BD I and II in order to generalise results to individuals who experience the most severe outcomes (National Institute of Health, 2009). BD I criteria are met if an individual has had at least one episode of mania regardless of presence of a major depressive episode. For a diagnosis of BD II to be made, an individual must report at least one episode of major depression, accompanied by at least one episode of hypomania.

1.2 Substance use disorder: an overview

Throughout this thesis, several terms related to substance use will be used. The DSM-IV (APA, 2000), is the diagnostic manual used to diagnose SUD, according to which, individuals can meet criteria for alcohol and other substance abuse or dependence. Abuse is the less severe of the disorders, diagnosed by presence of any one of the following: recurrent alcohol/substance use resulting in a failure to fulfil major role obligations, recurrent alcohol/substance use in situations in which it is physically hazardous, recurrent alcohol/substance related legal problems or continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance (APA, 2000).

To meet criteria for an alcohol/substance dependence disorder, an individual is required to display 3 or more of the following: alcohol/substance taken in larger amounts or over a longer period than was intended, persistent desire or unsuccessful efforts to cut down or control alcohol/substance use, a great deal of time spent obtaining, using or recovering from the effects of alcohol/ substance use, important activities given up or reduced because of alcohol/substance use, continued alcohol/substance use despite physical or psychological problems likely to have been caused or exacerbated by use and tolerance or presence of withdrawal symptoms.

A diagnosis of dependence overrides abuse so respondents can only meet criteria for either abuse or dependence at any one time. For more details of diagnostic criteria relating to substance abuse and dependence, see tables 1.4 and 1.5, appendix 1.

1.3 Dual diagnosis

Dual diagnosis is the term sometimes used to describe the co-morbid occurrence of a mental health disorder and SUD (abuse or dependence). High levels of substance use are reported in individuals with mental health problems (Regier et al., 1990) and it is generally accepted that substance use can complicate the course of illness and dually diagnosed patients can experience poorer outcomes such as higher rates of relapse, more hospitalisations, incarceration, homelessness and physical health problems (Drake et al., 2001).

1.4 Co-occurring bipolar disorder and substance use disorder

Research has consistently found high levels of SUD in patients with BD (e.g., Chengappa, Levine, Gershon, Kupfer, 2000; Conway, Compton, Stinson, & Grant, 2006; Grant et al., 2004; Kessler et al., 1997; Regier et al., 1990; Strakowski et al., 1998; Tohen et al., 1990). In fact, epidemiological research has revealed higher levels of SUD in BD than in any other Axis I Disorder (Regier et al., 1990) suggesting this is an area which requires a more thorough

understanding to facilitate the development of effective treatments. Despite the wealth of literature providing evidence for the existence of this co-morbidity, there is still relatively little consensus for the reasons behind this relationship (Bizzarri et al., 2007a). Several broad theories attempt to explain the high levels of co-occurrence (Strakowski & DelBello, 2000) and will be described in subsequent sections, but research supporting these theories is at an early stage and there remains much debate.

1.4.1 Prevalence of substance use disorder in bipolar disorder

Despite methodological differences in the way that SUD is assessed, and complexities involved with the assessment of BD and SUD, research has consistently shown high levels of SUD in BD. The National Institute of Mental Health (NIMH) Epidemiologic Catchment Area Study (Regier et al., 1990) administered the NIMH diagnostic interview schedule to 20,291 interviewees in the US to determine co-morbidity rates of mental health disorders and alcohol and drug abuse, and reported that 56% of those interviewed who met criteria for any BD also met lifetime criteria for SUD – and for BD I, rates were higher than for any other Axis I Disorder at 61%. The lifetime prevalence of SUD for people with BD is three to ten times higher than that of the general population and more than double that for people with major depression. Similarly, the National Co-morbidity Survey (Kessler et al., 1997), a large-scale field survey of mental health in the US, presented results showing that those with a lifetime diagnosis of alcohol dependence had a significantly higher chance of meeting criteria for mania than those without a history of alcohol dependence.

More recently, The National Epidemiologic Survey on Alcohol and Related Conditions (NESARC, Grant et al., 2004) assessed a US sample of 43,093 for co-morbidity of mood and anxiety disorders specifically with SUD. Once again, this survey found a higher prevalence of mania and hypomania in those with history of SUD (5% and 4%) compared to those without (2% and 1% respectively). Rates of SUD were also higher in those who had a lifetime diagnosis of mania or hypomania (28%, 27%) than in those without any mood disorder (10%).

Further support for high levels of SUD in BD in community settings comes from results from first episode mania studies, such as The University of Cincinnati first episode mania study (Strakowski et al., 1998), which found 46% of patients presenting with a first episode of mania met criteria for a lifetime diagnosis of cannabis use disorder and 42%, a lifetime diagnosis of alcohol use disorder. Furthermore, the McLean Harvard first episode mania study (Tohen et al., 1990) reported that 33% of participants with mania were assessed as having a current SUD – most commonly alcohol, followed by cannabis and cocaine use disorders. Similar results regarding the most common substances of abuse have been seen frequently - alcohol appears the most common substance reported for use among individuals with BD (Regier et al., 1990), followed by cannabis (Chengappa et al., 2000), then cocaine and opoids (Cerullo & Strakowski, 2007).

Inpatient studies have also shown high levels of co-morbidity. Cassidy, Ahearn and Carroll (2001) reported that from a sample of 392 patients hospitalised for manic or mixed episodes, almost 60% had a lifetime diagnosis of SUD. Brown, Suppes, Adinoff and Thomas (2001) reviewed prevalence of SUD in BD in both inpatient and outpatient settings and reported levels of 14% – 65% compared with 6% – 12% in the general population.

Limited research is available to corroborate these findings in different cultures. However, research from Taiwan (Tsai et al., 1996) showed lifetime rates of SUD in BD to be less than 10%. Clearly these results warrant further investigation. However, they suggest that high levels of SUD in BD might be influenced by culture.

Taken together, these results suggest that further investigation of the co-occurrence of BD and SUD is warranted as research across a broad range of settings show high prevalence.

1.4.2 Correlates of bipolar disorder and co-occurring substance use disorder

A number of correlates have been reported in association with patients who have co-occurring BD and SUD. For example, recent research suggests that individuals with co-occurring BD and SUD are more likely to be male, single or divorced (Mazza et al., 2009).

With respect to clinical correlates, some research has suggested that other psychiatric disorders might co-occur more frequently in individuals with BD and SUD than in those with either disorder alone. Sonne, Brady and Morton (1994) reported that in 44 patients, those with co-occurring BD and SUD were also more likely to meet criteria for another Axis I Disorder, most frequently, post traumatic stress disorder (PTSD). These results are consistent with those of Simon et al (2004) who found higher rates of SUD in patients with co-occurring BD and anxiety disorders. Goodwin and colleagues (2002) carried out a sub-analysis of 108 patients with severe affective disorders, 33 of whom had a diagnosis of BD, to investigate the association between lifetime diagnosis of anxiety disorder and SUD. Those patients who experienced panic attacks showed a trend towards disorders of cocaine, sedative and stimulant use compared to those without panic attacks. However, perhaps due to the small sample size, significant relationships were not found.

In a larger sample, Frye and colleagues (2003) examined variations between gender with relation to BD, SUD and anxiety disorders. It was reported that women with BD who had a history of alcohol use disorder were significantly more likely than those without to also have a lifetime diagnosis of panic disorder and social phobia. However, as these findings were in a sample of females with alcohol disorder, they cannot be generalised to the whole population or indeed, to those using substances other than alcohol. Mitchell, Brown and Rush (2007) assessed 166 outpatients with co-occurring BD and SUD using the Mini International Neuropsychiatric Interview (MINI) and reported that those patients with alcohol dependence were significantly more likely to present with generalized anxiety disorder and current depressed mood than those with cocaine dependence, who showed significantly higher rates of PTSD and anti-social

personality disorder. However, conclusions should be drawn with caution due to the varying sample sizes and assessment measures used in the above studies. Kolodziej and colleagues (2005) examined a sample of individuals who met criteria for BD and SUD and found that among 90 individuals, 48% met criteria for a lifetime anxiety disorder, the most common of which was PTSD. Significantly, the majority of these studies' sole inclusion criteria was BD and then further correlates were examined from those who presented with a co-occurring SUD, thus potentially introducing a bias toward a sample of individuals for whom substance use causes less severe impairment – indicated by their willingness to participate in research.

Kay, Altshuler, Ventura and Mintz (1999) examined the prevalence of Axis II disorders in a sample of 61 outpatients with BD I. Of this sample, 52% met criteria for a personality disorder (PD) as measured by the Personality Diagnostic Questionnaire-Revised (PDQ R). Those with a history of alcohol use disorder were significantly more likely to meet PD diagnosis (52%) compared with those without a history of alcohol use disorder (24%). This high level of PD diagnosis in those with BD and SUD has been replicated in more recent research (Mazza et al., 2009).

Clearly, individuals with co-occurring BD and SUD present more frequently with additional diagnoses than those with either disorder alone. As demonstrated above, anxiety disorders and PD appear most commonly associated with BD and SUD. Its possible that substance use is high in this client group due to some shared vulnerabilities (Raimo & Schuckit, 1998), that mental health difficulties cause individuals to use substances to help them to cope (Khantzian 1984, 1997) or alternatively that the use of substances causes, or further complicates the course of a BD (Winokur et al.,, 1995). Clearly an understanding of individuals' experiences of substance use may serve to clarify the nature of this common co-occurrence.

1.4.3 Outcomes of co-occurring bipolar disorder and substance use disorder

There is a great deal of evidence to suggest that substance use may have a negative impact on BD, and that individuals with both disorders might experience a more severe course of illness than those with BD without a co-occurring SUD (Strakowski & Cerullo 2007). The following section provides the specific areas in which research has suggested negative outcomes.

1.4.3.1 Medication compliance

There is relatively consistent evidence to suggest that treatment compliance rates are lower in those patients with a lifetime diagnosis of SUD in BD (e.g. Baldessarini, Perry & Pike, 2008; Goldberg, Garno, Leon, Kocsis & Portera, 1999; Haro, Goetz, Bertsch, Vieta & Van Os, 2006; Keck et al., 1998; Manwani et al., 2007; Sajatovic et al., 2009 Verduin, Carter, Brady, Myrick & Timmerman, 2005).

Using data from the University of Cincinnati first episode mania study, Strakowski et al (1998) found that BD patients with a co-occurring SUD showed greater rates of treatment non-compliance, which was later itself associated with poorer outcomes.

1.4.3.2 Suicidality

Similarly, relationships have been found across studies for elevated suicidality in patients with co-occurring BD and SUD. In early work, Morrison (1974) found increased levels of suicidality in a sample of 38 individuals with BD and alcohol use disorder and much research since has replicated these findings (e.g. Cardoso et al., 2008; Comtois, Russo, Roy-Byrne & Ries, 2004; Feinman & Dunner 1996; Goldberg et al., 1999; Goldstein et al., 2005; Goldstein & Levitt, 2008; Haro et al., 2006; Potash et al., 2000; Sublette et al., 2008; Tondo et al., 1999; Weiss et al., 2005)

1.4.3.3 Hospitalisations

Much research suggests that those with co-occurring BD and SUD experience more psychiatric hospitalisations. Hoblyn, Balt, Woodward and Brooks (2009) studied data on 2,963 veterans diagnosed with BD and found that of the whole sample, 20% were admitted to psychiatric hospital during the one year study period. Risk of being hospitalized was greatly increased by a co-morbid alcohol use disorder (87%), and even more so in those with poly-substance abuse. Other research supports this finding (e.g. Cassidy et al., 2001, Haro et al., 2006 and Singh, Mattoo, Sharan & Basu, 2005).

1.4.3.4 Course of Illness

Research has demonstrated that individuals with co-occurring BD and SUD may experience a more complicated course of illness. For example, Morrison (1974) found relationships between alcohol use disorders and early age of onset of BD and this finding was replicated by Sonne et al (1994). Pini et al (1999) also found, in a sample of 125 patients, the age of onset of BD was significantly lower in those who had other co-morbidities alongside BD and SUD. Dalton, Cate-Carter, Mundo, Parikh and Kennedy (2003) further reported that patients with a SUD reported an earlier age of onset of BD, and this finding has been replicated by other studies (e.g. Cardoso et al., 2008; Carter, Mundo, Parikh & Kennedy, 2003; Ernst & Goldberg, 2004; Haro et al., 2006).

Furthermore, individuals with BD and SUD have been reported to experience more mixed episodes which themselves are associated with poorer outcomes (e.g. Dalton et al., 2003; Ernst & Goldberg, 2004; Goldberg et al., 1999; Himmelhoch, Mulla, Neil, Detre & Kupfer, 1976). There is some evidence also to link the co-occurrence of BD and SUD to increased rates of rapid cycling (Ernst & Goldberg, 2004). Moreover, Tohen et al (2003) analysed data from the Mclean Harvard first episode mania study and found that of 173 patients followed up over a period of five years, those with SUD experienced a greater number of depressive episodes.

1.4.3.5 General Functioning

Sonne et al (1994) published the finding that patients with co-occurring BD and SUD reported spending a significantly reduced time in education, compared with those with BD alone in a sample of 44 participants with BD. Similar results were found in a larger, more recent sample of 186 patients with BD and SUD (Cardoso et al., 2008). Various studies have reported a relationship between co-occurring BD and SUD and decreased employment status (Haro et al., 2006; Tohen et al., 1990; Van Rossum et al., 2008).

1.4.3.6 Social Functioning

Finally, some studies have found a lifetime diagnosis of an alcohol use disorder to predict lower quality of life (QOL) ratings in patients with BD (Vojta et al., 1998). This result has been substantiated in a more recent study testing quality of life in dually diagnosed patients with BD, who scored lower on QOL rating scales when compared to those with BD or SUD alone and healthy controls. In this cross sectional interview study, QOL was negatively affected by the severity of alcohol dependence even after controlling for potentially confounding demographic variables (Singh et al., 2005). Though the evidence is strongly in favour of co-occurring BD and SUD negatively affecting QOL ratings, results from Singh et al (2005) require replication in a larger population, due to low numbers of patients with BD and SUD (n=40), a heavy male gender bias and an inability to generalise to cultures outside the country of research, Chandigarh, India.

1.4.3.7 Summary

Research has consistently shown SUD to be significantly associated with negative outcomes in BD (Cerullo & Strakowski, 2007), yet there remain many questions regarding the relationship between the two disorders. Does SUD contribute to, or actually cause the development of BD, or is substance use a symptom of, or a reaction to severe mood fluctuation?

The evidence for high prevalence rates and the subsequent outcomes related to co-morbid BD and SUD for the individual, families and society provide a strong case for developing a clearer understanding of the mechanisms involved in this co-occurrence. Much epidemiological research (Regier et al., 1999, Kessler et al., 1997; Grant et al., 2004) links these two disorders, suggesting that some element of BD may be more commonly linked with SUD than any other Axis I mental health disorder. In an attempt to understand what this element may be, and to elucidate any common themes or differences, the following sections will examine self reported reasons for substance use given by various clinical and non-clinical groups other than BD, before comparing these reasons with those given by individuals with BD.

1.5 Self reported reasons for use

1.5.1 Reasons for substance use in the general population

There is an extensive literature examining the reasons given for substance use by people without co-morbid mental health problems, most of which focuses on alcohol use.

1.5.1.1 Reasons for alcohol use

A recent review of drinking motives (Kuntsche, Knibbe, Gmel & Engels, 2005) presents a full summary of motives for alcohol consumption in young people, based on the assumption that heavy or excessive drinking in later life is generally initiated in adolescence. The review provides detailed discussion of the various methods used to measure motivations and reasons for alcohol use, ranging from simply requesting reasons by self report to using existing validated measures or developing measures specifically for the research. One of the most commonly used measures in this field of research is the Drinking Motives Questionnaire (DMQ; Cooper, Russell, Skinner & Windle, 1992). This measure is based on the Motivational Model for Alcohol Use (Cox & Klinger, 1988) which makes two assumptions; firstly that people drink to achieve specific outcomes and secondly that the decision to drink alcohol for a specific outcome will be individually and distinctly characterised depending on what that outcome is, be it social or coping related. The model proposes that various factors, such as past experiences and current situations will affect the decision to drink or not to drink, but that the final decision will be based upon the expected outcome. Other measures of drinking motives include the Drinking Motives Questionnaire Revised (Cooper, 1994); The Reasons for Drinking Questionnaire (Farber, Khavari & Douglas, 1980) and The Reasons for Drinking Scale (Carpenter & Hasin, 1998). All measures reviewed by Kuntsche et al (2005) incorporated coping motives (drinking to cope, coping with stress, tension reduction) plus one or more dimension, of which the most common were social motives (to be sociable/polite, social facilitation) and enhancement motives (pleasant emotions, mood enhancement, for enjoyment).

According to Kuntsche et al (2005), the majority of studies have shown that in general, young people drink for social reasons. For example, in a sample of young people in Argentina, 80% of respondents reported drinking for enjoyment compared with 7% to improve bad mood (Jerez & Coviello, 1998). Similarly, Plant, Bagnall and Foster (1990) reported that in a sample of young people in the UK, 94% of male heavy drinkers reported that their motivation for drinking was to make a party more enjoyable.

Generally, studies have associated social reasons for drinking with moderate drinking habits (Cooper, 1994). Enhancement motives on the other hand have been more consistently linked with heavy drinking, for example Carey (1993) reported that those participants who were assessed as heavy drinkers more frequently endorsed 'drinking to enhance pleasant emotions' than light drinkers. Furthermore, coping reasons for drinking tend to be even more commonly

associated with heavy drinking. Abbey, Smith and Scott (1993) report results of a population study where endorsers of drinking for coping reasons were more likely to be heavy drinkers than moderate or light.

In conclusion, the most commonly endorsed reason for drinking among young people without co-occurring mental illness is social/enjoyment related (Stewart, Zeitlin, & Samoluk, 1996). Fewer young people report enhancement reasons and those who do tend to be heavier drinkers (Carey, 1993). Fewer still report drinking for coping reasons (Stewart et al 1996) yet even more so, those who do tend to be heavier drinkers (Abbey et al., 1993). Due to the heavy emphasis on young people in many of the studies reported, general conclusions are restricted. It is likely that young peoples' motivations for drinking differ significantly to those of older adolescents and adults (Cox, Hosier, Crossley, Kendall & Roberts, 2006).

1.5.1.2 Reasons for cannabis use

Much of the research aimed at investigating reasons for drug use has been shaped by the alcohol literature. For example, Simons, Correia, Carey and Borsari (1998) used an adapted version of the DMQ (Cooper, 1994) to measure motives for using marijuana. A fifth subscale was added with the intention of capturing motives in relation to the psychedelic properties of marijuana use which would not have been associated with alcohol use. Perhaps unsurprisingly, this new subscale accounted for the most variance in cannabis use (Simons et al., 1998) which clearly high-lighted the need for a more specific understanding of marijuana use motives (Lee, Neighbors & Woods, 2007).

In an attempt to reach this understanding, Lee et al (2007) asked a sample of 634 students who reported use of marijuana, to consider their top five motivations for use and rank them in order of importance. Similarly to results reported in alcohol motivations research, the most commonly reported reason for using marijuana was enjoyment/ fun, endorsed by 52% of respondents. Conformity and experimentations were the next most commonly endorsed reasons, with both reported by over 40% of participants. Experimentation was most commonly the primary reason for use, reported by 29% of participants as their as most important reason. Other significant predictors of use included social enhancement (26%), boredom (25%), and relaxation (25%). Coping reasons were given by 18% of this non-clinical sample.

Some theorists suggest that cannabis use is linked to stress reduction and coping (Hyman & Sinha, 2009). A Stress-Coping model of addiction (Wills & Filer, 1996) suggests that drug use may occur when alternative methods of coping with difficult situations are not present, further proposing that substance use increases as and when levels of stress rise. Evidence to support this theory comes from studies of long term cannabis users. For example, Hendin and Haas (1985) conducted interviews which in part elicited reasons for use of cannabis – one of which reported by adults in the sample was escape or relief of problems and helping to cope with anger

or frustration caused by unhappy relationships. Furthermore, Johnston and O'Malley (1986) investigated reasons for use in relation to patterns and amount of cannabis used. The findings were consistent with alcohol related research; coping related reasons for cannabis use were more commonly reported by those who described heavier use.

Clearly conclusions should be drawn cautiously due to the heterogeneous methods in which data in this field is collected, and the heavy focus on Western samples making generalisation to non industrialised countries difficult. However, some comparisons can be made with findings from alcohol motives research; social reasons appear to be a commonly endorsed by the general population for alcohol and cannabis use. Unfortunately, cannabis motives research has yet to explore the possible impact that reasons for use and other factors such as age and gender may have on patterns of use, all of which may be important aspects when considering how experiences of substance use may affect, or be affected by such details (Green, Kavanagh & Young, 2003).

1.5.1.3 Reasons for other drug use

In line with studies of alcohol and cannabis use, a structured review of reasons for using ecstasy by Peters and Kok (2009) identifies a social theme in the general population. The authors list several categories of reasons which were highly relevant across one or several studies. These categories included a desire to be on the same level as friends, to enhance energy and dancing, to enhance mood, sex and social interaction, to enhance or change sensory perception, to experience very pleasant effects and to achieve intoxication or loose inhibition.

In addition, Van der Poel, Rodenburg, Dijkstra, Stoele and van de Mheen (2009) investigated motivations for cocaine use amongst a sample of 55 adolescents and young adults who had used cocaine in the past year. Motivations were presented in three distinct categories; firstly, the physical effects (giving users energy and making them less tired), secondly, the mental effects (giving users confidence and making them feel good), and finally, the social effects (enabling users to have a good time with friends). These three motivations were endorsed by the entire sample, and the mental and social motivations were perceived by the participants to be most important. However, this sample were all long-term cocaine users with a mean age of 23 years, so results may not be generalisable to a wider population.

1.5.1.4 Summary

Taken together, studies investigating reasons for substance use in the general population tend to most commonly conclude that social motivations are of high importance. There appears to be relatively low levels of substance use related to coping, but when coping reasons are endorsed it tends to be by those with heavier substance use, suggesting differences in substance use patterns between those who use for recreational purposes compared with those who use to

facilitate coping. One point to consider is that there has been little research into the reasons for use in those individuals with a diagnosed SUD, compared with a heavy focus on young people and adolescents with recreational levels of substance use. This is particularly relevant when comparing reasons for substance use by those with a co-occurring mental disorder who may be using substances more heavily than the general population, given that there is an increased level of diagnosis of SUD in those with mental health diagnoses.

1.5.2 Reasons for substance use in psychosis

A high level of SUD is reported in individuals with psychosis, with estimates of lifetime prevalence at around 50% (Regier et al., 1990). These results have been replicated in other epidemiological studies in the US (Kessler et al., 1997) as well as in studies based in the UK, for example, Barnes, Mutsatsa, Hutton, Watt and Joyce (2006), who reported a 68% lifetime prevalence of substance use for first episode schizophrenia patients. This has been an area of a considerable research interest recently due to the negative implications associated with substance use for people with psychosis (Gregg, Barrowclough & Haddock, 2007).

A recent review of reasons for substance use in psychosis (Gregg, Barrowclough, & Haddock, 2007) explored self reported reasons for use. Reasons for use were arranged into five categories, comparable to the three main reasons categories identified in the general population. These included intoxication effects (enhancement); social reasons (social); dysphoria relief (coping - general); psychotic symptoms (coping with psychosis); and medication side effects (coping with psychosis). In the 11 studies reviewed, a large degree of variance was evident. For example, in one study social reasons were endorsed by 8% of the sample (Baker et al., 2002) when in another, 81% endorsed social reasons as motivations for using substances (Schofield et al., 2006). Nonetheless, the majority of studies reviewed reported high levels of substance use in relation to symptoms of mental illness such relief of dysphoria as mentioned earlier – lending some support to the self medication hypothesis of substance use (Khantzian, 1985; 1997). However, the idea that substances alleviate specific symptoms of mental illness, such as depression or anxiety, would rely on evidence that substances are selected specifically for their individual effects, which is an area requiring further clarification (Gregg et al., 2007; Mueser, Drake & Wallach, 1998).

Researchers in this field have recently developed and validated a scale for assessing reasons for substance use in schizophrenia (ReSUS scale; Gregg, Barrowclough & Haddock, 2009b) which attempted to overcome some of the methodological limitations identified with previous methods. Gregg et al (2009a) developed a pool of reasons for substance use by reviewing previous literature; eliciting reasons for use given in therapy sessions with people with psychosis and substance use problems and conducting semi structured interviews with people with psychosis and current substance use. This pool of items was then condensed on the grounds of duplication, similitude and intelligibility (Gregg et al., 2009a) leaving 58 reasons for substance use. Forty five

participants with co-morbid psychosis and current SUD were then asked to sort these reasons according to their personal experience, indicating on a response grid which of the reasons they felt applied to them the most, and which they felt applied to them the least. This sorting process allowed for the researchers to compare the responses of each participant to others and identify any patterns in reasons for use within the sample. Reasons for use which were less commonly endorsed by participants completing the sort procedure were dropped from scale development and the remaining 40 items were randomly ordered and form the Reasons for Substance Use Scale (ReSUS scale; Gregg et al., 2009b), requiring participants to indicate whether they have ever used a substance for the reason listed. Two hundred and thirty people with psychosis completed the scale, from which principal component analysis of responses revealed a three factor solution. These factors were labelled as 'coping with emotions and symptoms', 'social enhancement' or 'intoxication/individual enhancement' (Gregg et al., 2009b). Furthermore, when relationships between subscales and psychotic symptoms and substance use were explored, positive correlations were found between the 'coping' subscale and positive symptoms, depression, suicide behaviour, quantity of drug use and problems associated with drug use. These results corroborate finding by Spencer, Castle and Michie (2002) who concluded that reasons related to coping with unpleasant affect and 'enhancement' predicted levels of substance use in a sample of 69 individuals with psychotic disorders. Together, these findings compare with those from studies in the general population, further supporting associations between coping reasons and substance use. This suggests that a possible mediator between heavier use and coping motivations is increased symptoms, lending some support to a self medication hypothesis of substance use (Khantzian, 1985; 1997).

In contrast however, Schaub, Fanghaenel, and Stohler (2008) conducted a study to compare reasons for cannabis use reported by individuals with a schizophrenia diagnosis and those given by non-diagnosed controls. Thirty six participants in each group completed a 15 item questionnaire based on reasons gathered from previous studies asking for validation of reasons for cannabis use. Analysis of the similarities and differences of reasons validated by both groups resulted in surprisingly little difference in reasons for use. The only reason which was endorsed significantly more by the schizophrenia patients was 'to reduce boredom'. The schizophrenia sample's main reason for using cannabis was to relax (89%) as was the main reason for the healthy controls (81%). Though the presence of a control group provides a useful comparison of reasons for use in those without a mental illness, the sample in this study is small (n=36) and controls were not matched for educational background or screened for psychosis. Furthermore, this study was conducted in Switzerland where cannabis use is widespread and legal sanctions are rare (Schaub et al., 2008), therefore results may not be generalisable to countries where cannabis use is less socially acceptable.

1.5.2.1 Summary

Clearly there is some evidence from studies of self reported reasons for substance use in individuals with psychosis that there are similarities with the reasons given for use in the general population. Social reasons remain a common motivation, as do 'intoxification' effects, comparable to 'enhancement reasons' discussed earlier including 'to get high, to feel good'. Generally, studies in this area have also found participants to endorse reasons related to coping. However, as Gregg et al (2007) point out, rather than motivations to cope directly with symptoms of psychosis, which are not commonly endorsed by participants in many studies (0 – 2% in Baker et al., 2002, and 8-11% in Scohfield et al., 2006) reasons related to coping with low mood, anxiety and boredom are more commonly reported (20 - 27% in Baker et al., 2002 and 49-86% in Scohfield et al., 2006). This finding may suggest that individuals with psychosis use substances to cope with general symptoms such as boredom and worry more than people in the general population, or it may be that as a result of the nature of living with a serious mental illness, individuals experience more distress and so use substances to cope. Alternatively, this result may correspond with research in the general population, which showed that coping reasons were more common in those who used substances more heavily, for example to the point where substance use becomes abuse or dependence, as is more commonly the case in individuals who experience psychosis than those who do not (Regier et al., 1990).

1.5.3. Reasons for substance use in major depression

There are also high levels of SUD found in individuals with major depressive disorder (MDD). Reports from the Sequential Treatment Alternative to Relieve Depression study (STAR*D; Davis et al., 2006) concluded that almost one third of patients with MDD also showed symptoms of a co-occurring SUD.

Little research has specifically investigated the self reported reasons for substance use in MDD. Much of the research that has elicited reasons for use with this patient group has focussed on the self medication hypothesis (Khantzian, 1985; 1997). Dixit and Crum (2000) report results of a one year follow-up of the Baltimore cohort of the National Institute of Mental Health Epidemiologic Catchment Area Project and report a greater risk of heavy drinking in female respondents who reported more episodes of depression at baseline. The authors hypothesise that increased suffering associated with symptoms of depression may result in increased attempts to medicate mood with alcohol. However, the study did not specifically address reasons for use, and so although findings reported are consistent with a self medication hypothesis, they may also be consistent with other explanations. Moreover, female only participants mean that results are not generalisble to males.

In a more direct observation of self medication related reasons for substance use in MDD, Weiss, Griffin and Mirin (1992) studied the motivations of drug use in 494 hospitalised 'drug abusers' using a self report questionnaire developed in previous studies (Weiss & Mirin, 1986; Griffin,

Weiss, Mirin, & Lange, 1989). Ten per cent of this sample had a diagnosis of MDD, but interestingly 63% of the entire sample reported using drugs to alleviate symptoms of depression. However, significantly, those patients with a clinical diagnosis of MDD reported using drugs for depression alleviation more than those without a diagnosis. Interestingly, men with MDD in this sample were more likely to use drugs for the relief of depressive symptoms than were women. However, the use of a non-validated measure of reasons for use questions the validity of these results, participants were asked to endorse reasons from a list of 287 generated by the authors based on previous research. Furthermore, the study failed to employ a standardized diagnostic interview with participants on entry to the study, and all participants were inpatients on a drug dependence unit in a hospital for support or detoxification from opoids, cocaine or sedative hypnotics. As alcohol remains the primary substance of misuse in clients with MDD and SUD (Regier et al., 1990), this sample was not representative.

The notion that self medication offers some explanation for substance use regardless of diagnosis is further supported by Leibenluft, Madden, Dick and Rosenthal (1993) who also found that alcohol dependent patients both with co-morbid MDD and those with alcohol use disorder alone, used alcohol to treat depressive symptoms regardless of the presence of diagnosis.

Furthermore, Arendt et al (2007) tested the self medication hypothesis in 119 cannabis dependent subjects by asking them to choose from a list (adapted from Dixon, Haas, Weiden, Sweeney & Frances, 1991) of their reasons for cannabis use. The most frequently reported reasons in this sample were relaxation, pleasure seeking, and the experience of being 'high'. Respondents also endorsed relieving unwanted emotions, such as depression and aggression. Similarly, an important finding in this study was that there was not a significant difference in reasons reported by those with MDD compared with the non-depressed group.

Finally, Bizzarri et al (2007a) investigated reasons for substance use in patients with SUD with co-morbid mood and anxiety disorders. They too found that subjects were likely to report using substances for self medication, regardless of whether they had a dual mental illness or not, suggesting that those with SUD alone may also use substances for mood regulation. Those subjects with MDD and SUD were significantly more likely to report using substances to alleviate boredom. Though suggesting some interesting differences between reasons for use of substances, this sample was small and predominantly female, and so is limited in generalisability.

1.5.3.1 Summary

It appears that in contrast to research in the general population presented earlier, in whom substance use may well have been recreational and occasional, in the field of depression, research with both non-clinical and clinical controls shows participants are more likely to use substances to self medicate. One possible explanation for this may be that in all of the studies presented above, the control group (those without a co-morbid psychiatric diagnosis) were either required to meet DSM criteria for a SUD (Bizzarri et al., 2007a; Leibenluft et al., 1993), ICD-10

criteria for cannabis use disorders (Arendt et al., 2007) or were hospitalised at the time for drug abuse (Weiss et al., 1992) – all thus requiring evidence of substance use causing substantial disruption in one or more areas of an individuals life, consistent with evidence presented earlier that heavier use is associated with more coping reasons.

1.5.4. Reasons for substance use in anxiety disorders

Strong associations have also been found between anxiety disorders and SUD (Merikangas et al., 1998). In this cross national investigation of co-morbidity of SUD and other disorders, 45% of the whole sample with a SUD also met criteria for an anxiety disorder. Bolton, Cox, Clara and Sareen (2006) reported rates from the National Co-morbidity Survey and found that 36% of patients with a generalised anxiety disorder met criteria for a co-occurring SUD. Though these rates are lower than those found in clinical samples (Bibb & Chambless, 1986) they remain a public health concern. Community-based samples have consistently supported this finding (Conway, Compton, Stinson, & Grant, 2006; Grant et al., 2004).

Similarly to MDD, self report research has focused on the self medication hypothesis of substance use in anxiety disorders. Robinson, Sareen, Cox and Bolton (2009) analyzed data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC, Grant et al., 2004) which surveyed over 43,000 people in the US. The survey made diagnoses for mood, personality, anxiety and substance use disorders, using the Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV), a standardised diagnostic scale, and assessed self medication behaviours within four anxiety disorder categories allowing for distinction or variance between substance within anxiety disorders. The authors also made distinctions between self medication with alcohol and other substances. Of this sample, self medication with alcohol was more prevalent in generalised anxiety disorder than in any other anxiety disorder (Robinson et al., 2009). Self medication with both drugs and alcohol was most prevalent in panic disorder with agoraphobia, and males were more likely to report self medication than females. This study lends compelling evidence in support of self medication as a reason for substance use in anxiety disorders. However, there was no measure of the frequency of self medication; those who had self medicated once in their lives were counted in the same category as those who may use substances to treat symptoms on a daily basis.

Finally, Thomas, Randall and Carrigan (2003) examined the hypothesis that participants with social anxiety would use alcohol for coping with social situations more than their matched controls. In this study, the socially anxious group were more likely to report drinking to feel more comfortable in social situations, and to avoid those situations if alcohol was unavailable. The socially anxious participants also reported a greater degree of relief from alcohol.

1.5.4.1 Summary

In summary, the available literature concerning reasons for substance use in anxiety disorders has tended to support a self medication theory. It is possible that the restricted range of reasons given is a consequence of biased questioning which focussed on self medication without eliciting other reasons for substance use (Bolton et al., 2006; Robinson et al., 2009). Furthermore, qualitative studies with those who reported using substances, but not self medicating for anxiety symptoms would be extremely useful. What are their reasons for use if not to cope with symptoms?

1.5.5 Self reported reasons for use: Summary

In summary, studies on self reported reasons for substance use within specific clinical groups are hugely varied. Where studies exist, they employ a wide range of methods for data collection, making comparisons difficult. In certain clinical groups, direct exploration of self reported reasons simply does not exist. However, there does appear to be a trend for reasons for all groups reviewed so far to fall loosely into the 3 categories initially identified in the extensive research carried out on reasons for alcohol use in the general population (Cooper, 1994). This work places motivations for use in social, enhancement or coping subgroups. When research explores reasons in specific subgroups, the 'coping' subscale relates to symptoms experienced by the clinical diagnosis under investigation, for example coping in psychosis may to some extent include managing side effects of medication or managing voices whereas coping in MDD appears more concerned with managing low mood. Generally, where the issue was directly investigated, if coping motivations are endorsed, heavier substance use is evident, though there is a lack of direct exploration of this in several areas, such as self reported reasons for use in MDD and anxiety disorders.

Coping reasons are also cited by individuals without specific mental health diagnoses, more so in studies where control groups are made up of participants with SUD only, where it is possible that either substance use to cope is widespread regardless of diagnosis, mental health problems are masked by substance use, or coping is related to other external factors such as lifestyle and background. Boredom appears a common reason for substance use across several groups, but more prominently in clinical groups such as those with psychosis or MDD, an important clinical consideration for the treatment of SUD in groups with co-occurring disorders.

1.6 Explanations for high levels of substance use in bipolar disorder

Several theories attempt to explain the high co-occurrence of SUD in BD. Strakowski and DelBello (2000) examined four theories with reference to available evidence, and concluded it was likely that all four mechanisms play a role in the relationship between the two disorders. In the

following section, the 4 theories described by Strakowski and DelBello will be briefly outlined, reviewed and updated.

1.6.1 The Self Medication Hypothesis

One theory which has received a great deal of attention is the Self Medication Hypothesis (Khantzian, 1985; 1997). This theory suggests that substances are used to treat symptoms which are causing individuals physical or emotional distress; in the case of BD, to medicate mood symptoms such as dysphoria, hypomania or mania. Support for this hypothesis has come mainly from patient report. For example, in the first study to ask participants with BD and co-occurring SUD their reasons for substance use (Sonne et al., 1994), 96% reported using alcohol or other drugs to 'help their mood'. Much self report data has since confirmed these results (e.g. Bizzarri et al., 2007a; Bizzarri et al., 2009; Bizzarri et al., 2007b; Bolton, Robinson & Sareen, 2009; Healey et al., 2009; Morriss et al., 2011; Weiss et al., 2004) which will be described in subsequent sections of this chapter.

Other than from patient self report, there has been little direct evidence to support the theory of self medication as a stand alone explanation (Mueser et al., 1998). In part, a large difficulty faced by the theory is the substantial body of evidence which indicates that in most cases of co-occurring BD and SUD, it seems SUD predates the onset of affective symptoms (e.g. Feinman & Dunner, 1996; Strakowski, McElroy, Keck & West, 1996; Strakowski et al., 1998). A possible explanation for this is that alcohol or substance abuse masks the affective symptoms of BD, so delaying the appearance or recognition of symptoms until later on, an idea supported by Morrison (1974) who found that the mean age for detection of BD in patients with alcohol disorders was 28 years compared with their non-alcohol counterparts (age 23).

A second criticism of the self medication hypothesis is that it assumes that if individuals use substances to modulate or control mood symptoms, it would be reasonable to assume that certain substances would be selected in certain situations. For example, someone seeking sedation from euphoria might choose a depressant such as alcohol or cannabis to bring their mood down, whereas someone seeking a lift in mood when feeling flat or dysphoric might select a stimulant to achieve the desired effect. Weiss and Mirin (1987) reported an increase in stimulant use during manic episodes used to maintain euphoria as opposed to moderating symptoms as one might expect according to the theory, but there remains a lack of empirical evidence to support this since.

1.6.2 Substance abuse causes bipolar disorder

A second theory proposes that substance use may play a role in the initiation of BD. This theory postulates that repeated substance use may cause brain function changes which in turn cause affective symptoms associated with BD. The theory suggests that either the use of substances causes symptoms that mirror affective symptoms (Goodwin & Jamison, 1990) or that in certain

vulnerable individuals; substances cause the initial mood disorder. Evidence to support this theory initially comes from research discussed earlier suggesting that in most cases, SUD occurs prior to the onset of BD (e.g. Feinman & Dunner, 1996; Strakowski et al., 1996; 1998). Lending further evidence, Winokur, Cook, Liskow and Fowler (1993) found that patients with BD and co-occurring alcohol misuse were less likely to have family members with psychiatric histories than those without alcohol misuse, suggesting that the alcohol component initiates bipolar symptoms even in families where there is no genetic predisposition. However, this research has not since been replicated, and other studies have in fact found there to be higher levels of alcohol use disorder in those with family histories of BD with alcohol use disorder (Maier & Merikangas, 1996).

1.6.3 Substance abuse is a symptom of bipolar disorder

A third theory proposes that BD by its nature causes certain individuals to use substances, that is, substance abuse may be a symptom of BD. Researchers have suggested that people who have BD commonly take part in excessive behaviours (Jamison & Goodwin, 1990), one of which could be substance use. This theory would assume that there are fluctuations in substance use according to symptoms of BD, for example, that people use more substances during affective episodes. Some research has supported this, for example, Mayfield and Coleman (1968) measured alcohol consumption in a sample of 59 patients with BD and concluded that 32% increased substance consumption during an episode of mania. Similarly, Reich, Davies and Himmelhof (1974) reported one third of 40 patients increased alcohol consumption during a manic episode. Interestingly, both studies reported lower numbers of patients increasing alcohol use when depressed. In contrast, other studies have found that patients were actually more likely to increase alcohol use during depressive episodes than manic episodes (Hensel, Dunner & Fieve, 1979). In a sample of 173 individuals, 15% increased alcohol consumption when depressed, compared with only 10% when manic. However, all of the aforementioned studies relied on retrospective assessments of alcohol consumption and where significant changes were evident, no quantification of changes were presented. None of the listed studies used control groups and these studies reported data on alcohol use only and so would not be generalisable to drug users. Strakowski, DelBello, Fleck and Arndt (2000) concluded that approximately 25% of patients increase their alcohol consumption during mania and there is little evidence to support any reduction of alcohol use during a manic phase, however around 75% of patients do not report a change in their drinking through a manic episode. Similarly, around 15% of patients increase or decrease their drinking during depressive episodes but in the majority, no significant change is reported. As presented earlier, Weiss and Mirin (1987) reported an increase in stimulant use during manic episodes. Clearly there is need for further qualitative investigation of those who do report changes during affective symptoms. However it seems that the suggestion that substance use may be a symptom of BD, or characteristic of people who experience severe

fluctuations of affect alone cannot fully account for the high levels of SUD in patients with BD. It may, instead offer partial explanation for substance use for some individuals (Strakowski et al., 2000).

1.6.4 Substance use and bipolar disorder share common risk factors

A final explanation of the co-occurrence is the proposal that BD and substance use have shared vulnerabilities. The earliest part of this theory suggests that a genetic vulnerability exists for the development of BD and SUD; that is certain genes contribute to the development of substance use in BD. Studies that have offered support for this theory include Hensel et al (1979) who explored the family histories of patients with BD and found that those with co-occurring alcohol use disorder had higher rates of alcoholism. However, other studies have rejected this theory (e.g. DelBello et al., 1999) finding no difference in the familial rates of BD between those with and without co-occurring SUD. More recently, it has been proposed that BD and SUD may share common personality vulnerabilities such as highly responsive Behavioural Activation Systems (BAS) and impulsiveness.

1.6.4.1 The Behavioural Approach System (BAS) hyper-sensitivity theory of BD and SUD (Depue & Iacono, 1989)

This theory suggests that individuals who are vulnerable to BD may have a particularly sensitive BAS which reacts excessively to certain cues. When introduced to BAS activation relevant events such as reward incentives or goal attainment, an individual with a hyper responsive BAS may experience excessive BAS activation. Hypomanic symptoms are hypothesised to reflect this excessive activation (e.g. lack of need or desire for sleep, inflated self esteem, and pressured speech). According to this theory, the high level of co-occurrence between BD and SUD may be partly related to an individual with BD's intent on pursuing stimulating and rewarding goals, such as the high associated with substance use.

Much research exists to support the BAS hypersensitivity model of BD (Alloy et al., 2008; Carver and White, 1994) and recent empirical studies have begun to provide support for the idea of a BAS hypersensitivity model for substance use. Several theorists have suggested that substance use may partly be established and/or maintained by reward sensitivity and drive. As such, high BAS activation relevant events, for instance goal striving could be achieved by the rewarding properties of substances; supporting the idea that high BAS activation would lead to higher levels of substance misuse. Support for this theory of substance use, though at an earlier stage than that for BD, comes mainly from cross sectional and retrospective studies which have demonstrated positive associations between self reported BAS sensitivity and substance use (Franken & Muris, 2006).

1.6.4.2 Impulsivity

Recent research has suggested that high levels of impulsivity may be a link between the high levels of SUD in BD. High levels of impulsivity have been found in those with substance abuse (Moeller, Barratt, Dougherty, Schmitz & Swann, 2001) and are also evident in BD individuals during mania, and higher still in patients with BD and co-occurring SUD, regardless of mood state (Swann, Dougherty, Pazzaglia, Pham, & Moeller, 2004).

A longitudinal study (Alloy, Bender & Wagner, 2009), which set out to investigate whether the BAS sensitivity and impulsiveness are both present as personality vulnerabilities in individuals with co-occurring bipolar spectrum disorders and SUD, compared 132 individuals with the co-morbidity with 153 healthy controls using self report measures of behaviour activation (BIS/BAS scale; Carver & White, 1994) and the Impulsive Nonconformity Scale (Chapman et al., 1984). Results suggested that high BAS sensitivity and impulsiveness may in part represent a shared vulnerability for BD and SUD. Firstly, those participants with bipolar spectrum disorders showed significantly higher scores on self reported BAS sensitivity and self reported impulsiveness. Furthermore, both high BAS sensitivity and high impulsivity predicted greater substance use related problems during follow up.

1.6.5 Summary

In summary, a great deal more exploration of the relationship between substance use and BD is required to fully understand the causes for high levels of co-morbidity. However, empirical evidence suggests that each of the theories presented may play a role in explaining the high levels of co-morbidity reported, and that individual differences, diagnostic issues or research methods may to an extent account for some of the disagreement among explanations. Studies in this area have tended on focus on designs which have prevented qualitative investigation of participant's experiences. As discussed earlier, research investigating self reported reasons for use in individuals with psychosis has developed understanding of why there may be such high rates of co-occurrence, and continues to do so with the use of a validated measure (Gregg et al., 2009b) which can be effectively used in large numbers of participants in order to make findings more generalisable in the future, potentially leading to developments in the design of treatment for this client group.

It is evident that a gap in research exists regarding reasons for substance use given by patients with co-morbid BD and SUD, discussed in the next section.

1.7 Reasons for substance use in bipolar disorder: The self report literature

More recently research has explored reasons reported by individuals with BD who either currently use substances or have used them heavily or regularly in the past. This self report literature assumes that a better understanding of the motivations behind substance use would help to

clarify exactly what aspects of treatment might be beneficial in supporting people to reduce substance use.

In order to examine the self reported reasons for substance use given by individuals with a diagnosis of BD and to ascertain whether a clearer understanding of individuals' reasons for use contribute towards an explanation for the high levels of SUD reported in BD (Regier et al., 1991), a systematic literature review was performed.

1.7.1 Literature review

Studies were identified following a search for combinations of the keywords: bipolar disorder, mania, manic depression, alcohol use, alcohol abuse, drug use, drug abuse, substance use, substance abuse, co-morbidity and dual diagnosis in three databases: PsychINFO, Medline and Embase. In addition, the bibliographies of articles were examined in order to include any further relevant studies. Studies published in English language which asked patients with BD, or mixed samples including patients with BD, to report their current, or past reasons for using substances were included.

The required minimum percentage of individuals with BD in each study was set at 20% to ensure adequate representation of the experiences of those with a diagnosis of BD. In total, 16 studies were identified and of these, seven did not provide detailed diagnostic inclusion criteria (Bergman & Harris, 1985; Green, Kavanagh & Young, 2004; Henwood & Padgett, 2007; Laudet, Magura, Vogel & Knight, 2004) or included less than 20% of participants with a diagnosis of BD (Baker et al., 2002; Bernadt & Murray, 1986 and Spencer et al., 2002), so were excluded. Nine studies provided diagnostic information and included at least the minimum number of individuals with BD in the sample.

Table 1 presents details of sampling and methodology in the nine studies selected for review.

Table 1: Details of sampling and methodology in studies investigating self reported reasons for substance use by participants with bipolar disorder.

Author	Sample	Methodology
Warner et al (1994)	79 drug/ alcohol users with schizophrenia, schizoaffective or BD (34%). Outpatients.	Interview (adapted from Test et al., 1989) eliciting free response of reasons for substance use
Sonne et al (1994)	44 In/out patients with BD: 41% current drug/ alcohol use 27% past drug/alcohol use 32% no substance use.	Interview asking: "Have you ever used alcohol or other drugs to help your mood?"
Weiss et al (2004)	45 individuals with BD and current drug dependence.	Drug and Alcohol Use Questionnaire (Weiss, 1992) – developed by the authors in a previous study.
Bizzarri et al (2007a)	146 total sample 61 SUD + mood/anxiety disorder (22% BD) 35 drug (heroin) disorder only 50 control	Interview (SCI-SUBS; Sbrana et al., 2003) Interview schedule included questions relating to self medication.
Bizzarri et al (2007b)	189 total sample 47 BDI only 57 BDI + drug/ alcohol disorder 35 drug/ alcohol disorder only 50 Healthy controls	Interview (SCI-SUBS; Sbrana et al., 2003) Interview schedule included questions relating to self medication.
Healey et al (2009)	15 patients (BDI) Alcohol/ drug disorder (lifetime)	Qualitative semi-structured interview Outline: Course of illness and experience of substance use
Bolton et al (2009)	Data from NESARC (n=43,093) (National Epidemiologic Survey on Alcohol and Related Conditions)	NESARC survey included: Interview schedule included questions relating to self medication.
Morriss et al (2011)	217 patients with BD 26% problem alcohol use	Bespoke questionnaire designed by authors– list of 9 reasons extracted from the literature.
Bizzarri et al (2009)	108 participants with psychosis 63% BD 28% schizophrenia 9% MDD	Interview (SCI-SUBS; Sbrana et al., 2003) Interview schedule included questions relating to self medication.

As demonstrated in table 1, studies exploring reasons for substance use in participants with BD vary extensively by sample and methodology. A number of these studies employ mixed samples including individuals with schizophrenia or schizoaffective disorder (Warner et al., 1994) or anxiety disorders (Bizzarri et al., 2007a). The majority of studies reviewed explore reasons for use of alcohol and drugs (Bizzarri et al., 2007b; Bizzarri et al., 2009; Bolton et al., 2009; Healey et al., 2009; Sonne et al., 1994; Warner et al., 1994), while others focus specifically on reasons for alcohol use (Morriss et al., 2011) or drugs alone (Bizzarri et al., 2007a; Weiss et al., 2004).

The methods used to elicit reasons for substance use in the above studies are also variable. Some research has elicited free response regarding reasons for use (Warner et al., 1994), while others have asked direct self medication related questions such as "Have you ever used alcohol or other drugs to help your mood?" (Sonne et al., 1994) and others have used newly developed measures (Morriss et al., 2011; Weiss et al., 2004) or interviews validated to assess self medication with substance use amongst other domains such as sensation seeking and sensitivity to substances (Bizzarri 2007a; 2007b; 2009).

Furthermore, the majority of the selected studies are carried out in the US, with the exception of Healey et al (2009) from the UK and Bizzarri (2007a; 2009; 2007b) which were conducted in Pisa, Italy.

1.7.2 Frequency of reasons for use

As noted in earlier sections, reasons for substance use fall into categories broadly termed social, enhancement and coping. In order to examine the reasons for substance use reported by studies included in this section and compare them with those reviewed in earlier sections, Table 2 provides a breakdown of the available frequencies relating to the amount of times a reason from within each category is endorsed in each study. A qualitative study examining reasons for use in individuals with BD (Healey et al., 2009) is not included in the table, and will be discussed in subsequent sections.

- The 'social reasons' category includes reasons for use such as activity with friends, feeling at ease in social situations and feeling more likeable.
- The 'enhancement' category includes reasons for use such as to increase energy, stay awake, be more competitive, creative or to enhance or maintain mania.
- The 'coping' category has been further broken down into types of coping such as:

1. Coping related to depressive symptoms such as use to help low mood.
2. Coping related to manic/hypomanic symptoms such as use to slow down racing thoughts.
3. Coping related to physical symptoms such as use for managing pain or to feel better physically.
4. 'Other' types of coping such as substance use related to unspecified mood (neither high or low), boredom, relaxation, psychotic symptoms such as hallucinations, anxiety, medication side effects and managing repetitive thoughts.

Table 2: Self reported reasons for substance use by individuals with bipolar disorder

Authors	**Reasons for Substance Use (% endorsed)**					
	Social Reasons	**Enhancement Reasons**	**Coping Reasons**			
			Depression related	*Mania related*	*Physical symptoms*	*Other*
Warner et al (1994)	38 – 73	26	47	0	35 – 36	11 – 62
Sonne et al (1994)	0	0	8 – 29	38	0	96
Weiss et al (2004)	0	0	78	58 - 68	0	93
Bizzarri et al (2007a)	43	33 - 86	0	0	0	34 - 62
Bizzarri et al (2007b)	30 - 33	25 - 72	56 - 79	0	26	18 - 79
Healey et al (2009)	-	-	-	-	-	-
Bolton et al (2009)	0	0	32 – 41	8 - 28	0	35 – 41
Morriss et al (2011)	71 – 82.5	45.6 – 70.2	39 – 81	36 – 70	0	43 – 95
Bizzarri et al (2009)	12 - 20	31	86	36	0	24

The table clearly demonstrates a large amount of variance in individual's reasons for substance use within the studies reviewed. The following sections provide a description of reasons endorsed within each sub category as introduced in table 2.

1.7.2.1 Social reasons for substance use

As demonstrated in table 2, an important finding in the literature investigating reasons for substance use in individuals with BD is that, similarly to studies in the general population which have found social reasons to be the most regularly endorsed motivation for use (Kuntsche et al., 2005), participants with a diagnosis of BD endorse social reasons also. The main and most commonly endorsed reason given for substance use in a sample of 79 patients in Warner et al (1994) was 'activity with friends', however this sample consisted of people with mixed diagnoses and only 34% had a diagnosis of BD. Bizzarri et al (2007b) examined reasons for alcohol and substance misuse in a BD sample. The authors hypothesised that those patients with BD and SUD would have higher sensitivity to substances than controls with either SUD alone or neither BD or SUD, and would score more highly on the 'sensation seeking' element of the Structured Clinical Interview for the Spectrum of Substance Use (SCI-SUBS; Sbrana et al., 2003), a scale eliciting yes/no answers to 131 items across 6 domains: substance use and improper use of substances, sensitivity to drugs, use of substances for self medication, sensation seeking, attention deficit disorder symptoms; and typical symptoms of SUD. The BD and SUD group frequently reported reasons comparable to the general population (e.g. Cooper, 1992; Kuntsche et al., 2005; Stewart et al., 1996) such as to alleviate boredom, to relax after work, to escape from reality and to improve performance. For participants with BD the use of substances was not simply linked to depressive or manic phases of illness, but throughout euthymic periods also, suggesting that something other than 'mood dysregulation' is responsible for the use of substances.

This finding is further supported by a recent qualitative study (Healey et al., 2009). The first qualitative study with this client group allowed researchers to systematically analyse reasons for use given by individuals with co-existing BD and SUD based on the premise that improving outcomes for people with this co-morbidity would be achieved by an understanding of how reasons for substance use relate to people's manic or depressed phases (Weiss, Griffin et al., 2007). Authors concluded that successful intervention depends on an understanding of a client's perspective which would both aid formulation, and be used to motivate and support people to change (Healey et al., 2009). The study used a purposive sample of patients with BD and current or past SUD (Healey et al., 2009) and explored individual's reasons for substance use using semi structured interviews. A grounded theory approach revealed five themes around substance use including 'experimenting in the early stages of illness', 'living with serious mental illness', 'enjoying the effects of substances', 'feeling normal' and 'managing stress'. The main findings were that patients' personal experiences played a key role in the beliefs they held about substance use. Reasons were idiosyncratic; patients gave very different reasons for using alcohol and drugs at different times, for example, while one person reports drug use to extend manic symptoms, others report use to reduce the same symptoms. Although there was some evidence of self medication, again, many patients reported reasons similar to those without co-occurring

mental illness: social reasons, stress management, or to 'fit in'. A key finding from this paper is that individuals' own personal experiences of the negative effects from substance use on symptoms, rather than advice from professionals or family members and friends, is a key motivation for change; highlighting the need for a validated way to measure individual motivations for use in order to understand experience and deliver effective interventions.

Morriss et al (2011) present the results of a prospective study examining the drinking patterns of 217 participants with BD over 72 weeks with particular focus on how self reported reasons for alcohol use relate to mood and social outcomes across the same follow up period. A short questionnaire developed by the authors derived from a literature review asked participants to confirm whether they had used alcohol for any of nine listed reasons answering in a yes/ no format. Social reasons for drinking (to relax; because others were doing it) were endorsed more than half the time during the follow up period. However, unfortunately this method did not allow for the identification of key motivations for use. Moreover the sample in the study potentially failed to represent the high levels of patients with BD who have current co-morbid SUD, as data was collected from patients participating in a randomised control trial (RCT) for cognitive behavioural therapy (CBT), who therefore were not recruited according to substance use criteria. For this reason, many participants in the study were drinking within safe limits. Though the authors adapted diagnostic interviews to allow for a substance 'misuse' diagnosis to capture those participants who did not meet criteria for substance abuse, only a small number of participants met current diagnostic criteria for a substance abuse or dependence disorder (10%). This makes the results of this study less generalisable to participants with current SUD.

1.7.2.2 Enhancement reasons for substance use

There is a considerable body of evidence in the available literature to suggest that individuals with BD use substances for motivations other than those of a social nature. In line with studies conducted with various clinical samples, individuals with BD appear to also endorse 'enhancement reasons' regularly. For example, Bizzarri (2007a) reported that 33% patients with co-occurring BD and SUD endorsed using substances to become more competitive and an even greater number (52%) indicated that their substance use helped them to 'reach a new dimension', a significantly higher number than in a SUD group alone, though comparable with those with co-morbid SUD and MDD (50%).

There is some evidence to support that for some individuals with BD, substances are used as a means to achieve or enhance manic episodes, a reason endorsed by 86% in one study (Bizzarri et al., 2007a) and 70% (Bizzarri et al., 2007b) in another. Subsequent studies have failed to replicate these findings, however, Morriss et al (2011) concluded that a significantly greater number of high constant or intermittent drinkers (35%) compared with no use or low alcohol use (8.5%) reported using alcohol in order to treat, or boost mania at eight week follow up, suggesting this motivation may be characteristic of heavier drinkers or drug users with BD. If a

shared vulnerability model is to offer some explanation to the high co-occurrence of SUD in individuals with BD, it would be expected that a common reason for use is to enhance affective states or induce mania, indicating this may be an important issue for future research to address.

1.7.2.3 Coping reasons for substance use

A considerable number of studies conducted with individuals with BD have concluded that reasons for use are related to coping, possibly lending support to 'self medication' as an explanation for the high levels of co-morbidity in this area. Warner and colleagues (1994) found a high proportion of subjects endorse reasons such as relief of unpleasant affective states, such as depression and anxiety. Consistent with this finding, Sonne et al (1994) reported a high number of subjects endorsing self medication reasons for substance use. During a structured interview with the researcher, participants were asked "*have you ever used alcohol or other drugs to help your mood?*" Of the BD and SUD group, 96% replied yes. Thirty eight per cent reported that this was to decrease manic symptoms; 29% had used alcohol when depressed and 13% had used cocaine when depressed. A further eight per cent used alcohol to dampen manic or depressed symptoms. Similarly, Weiss et al (2004) investigated reasons for use and perceived substance induced improvement related to the self medication hypothesis in 45 patients with co-occurring BD and SUD. Nearly all patients reported initiating substance use due to at least one psychiatric symptom (93%) with the percentages for different symptoms as follows: depression (77%), racing thoughts (57.8%) and irritability (57%).

As previously noted, Bolton et al (2009) used data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). Self medication related questions were included in the survey, asking whether respondents had ever used alcohol or drugs to improve their mood or make them feel better when they were down, and self medication rates were determined specifically for mood disorders. Almost a quarter of respondents with a mood disorder reported using substances to treat or medicate problems associated with affective symptoms, the highest of which was in those with BD, where 41% of respondents reported 'self treatment'. Qualitative support for mood related substance use comes from Healey et al (2009), as some participants suggested that a role of substance use was connected with the stigma of living with a mental illness and 'feeling normal'.

Notably, participants followed up by Morris et al (2011) also commonly endorsed mood related reasons for alcohol use. Drinking to treat depression and social reasons were more consistently endorsed by those rated as 'problem drinkers' at initial assessment. Both social and mood related reasons remained constant across the 72 week follow up period suggesting that reasons for use were related to current experiences. The authors also noted that intermittent heavy drinking appeared to be common amongst the sample, as opposed to constant or dependent drinking which may provide further support to the use of alcohol during certain phases of the illness, rather than across all phases consistently.

Noted earlier was the relationship between those in the general population who reported substance use for coping reasons and higher levels of substance use (Cooper, 1994; Abbey et al., 1993). One possible explanation for this is that those with more distressing symptoms to cope with may use substances to a greater extent because of the perceived effects on symptoms.

Interestingly, several studies where control groups are used showed that patients with SUD alone also endorsed reasons related to symptom control such as to relieve mood and anxiety or to help in social phobia situations (Bizzarri et al., 2007b). In fact, this study concluded no significant differences in reasons for use between a group of individuals with BD and SUD compared with a group with SUD alone. Similarly, Bizzarri (2007a) investigated vulnerability factors in patients with and without mood and anxiety disorders to explore the hypothesis that co-morbidity occurs as a result of these shared vulnerability factors. They used the SCI-SUBS, (Sbrana et al., 2003), and close investigation of the self medication domain of this assessment revealed that although there was significantly greater endorsement of self medication reasons for use in those patients with BD and co-morbid SUD than in those with SUD alone, participants across all groups endorsed reasons related to symptom management in line with a self medication theory. Patients with SUD reported using substances as an attempt to relieve depression, to achieve or maintain euphoria or to improve confidence and/ or social abilities regardless of the presence of BD. Further investigation is needed to corroborate these findings as the BD group in this study consisted of only 21 participants.

Finally, a later study (Bizzarri et al., 2009) using the same clinical interview (SCI-SUBS; Sbrana et al., 2003), compared a group of patients with psychotic disorders and a co-occurring SUD diagnosis with a group of patients with a diagnosis of psychosis and no history of SUD. Exploration of participants' reasons for substance use revealed some differences between the two groups. Those participants with psychosis and SUD were more likely to report substance use related to relieving depression and achieving or maintaining euphoria than participants without a co-morbid diagnosis of SUD. The study concluded that patients with co-occurring psychosis and SUD were more likely to self medicate than those with psychosis alone. Unfortunately, this study was not able to analyse results separately based on specific diagnosis, as the sample included participants who experienced psychosis within schizophrenia spectrum disorders, BD and MDD.

1.7.3 Variability in reasons for use studies

There is a considerable degree of variability of results between studies, some of which may be in part due to differences in sampling and methodology, as demonstrated in table 1, page 35.

Firstly, the majority of studies looking at reasons for substance use in BD have used relatively small samples (e.g. Warner et al., 1994; Sonne et al., 1994) and so generalisation of results to a wider population is not possible. One study (Morriss et al., 2011) has looked at self reported reasons for use in a larger group, however this paper reports results from a sample of individuals

with a BD diagnosis recruited into an RCT of CBT, employing participants who do not consider alcohol to be a current concern, meaning results cannot be generalised to those with SUD.

Secondly, substance use inclusion criteria for these studies differed, in that some studies recruited individuals who were 'substance users' (Sonne et al., 1994) and others required participants to meet a given substance use criteria by using various instruments to measure levels of substance use such as the measure of multi drug abuse (Warner et al., 1994) and more commonly the Structured Clinical Interview for DSM-IV disorders (e.g. Healey et al., 2009).

Similarly, variance exists in the BD 'sub-types' recruited by studies for example, from Healey et al (2009) who recruited a full sample of patients meeting criteria for BD I to Bolton et al (2009) who present data from subjects meeting criteria for BD I and BD II and Warner et al (1994), presenting results from a mixed psychiatric sample.

Additionally, some studies (e.g. Bolton et al., 2009) employed measures which directly asked questions regarding self medication such as "*have you ever used drugs or alcohol to self medicate?*" Unsurprisingly, these studies presented high levels of individuals who replied affirmatively. In many of these cases, there was no further clarification of how often self medication had taken place.

This variability in sampling and design not only provides some explanation as to the varying reasons for substance use reported by individuals with BD, but also makes comparing results problematic. The following section provides an interpretation of how the studies presented above may contribute to an understanding of BD and SUD co-morbidity.

1.8 How do self report studies contribute to our understanding of substance use disorder in bipolar disorder?

An important question regarding reasons for substance use in individuals with BD is why there are consistently high levels of SUD reported in BD in comparison to other psychiatric disorders. One possible explanation is the euphoric or manic element of BD. As noted above, several studies have found reasons for use to be related to the manic phase of illness in patients with BD. In early work, Sonne et al (1994) found that 38% of participants endorsed using substances to decrease manic symptoms. Similarly Weiss et al (2004) reported 58% respondents report using substances to reduce symptoms associated with mania such as irritability and racing thoughts. Conversely, as previously noted, patients have also reported using substances to induce, maintain or achieve mania (Bizzarri et al., 2007a; 2007b).

Taken together these studies suggest a great deal more exploration is necessary before conclusions can be drawn about the processes responsible for the high co-occurrence of SUD in BD. It can be concluded from work to date, that some substance use may be an attempt to medicate the distressing symptoms of BD. However some substance use may be unconnected to mental illness and more associated with other issues such as lifestyle. There are clearly individual

differences in reasons for substance use in research with individuals with BD, as noted by Strakowski and DelBello (2000) and existing theories fail to explain all cases of SUD in BD.

Despite the sampling and methodological issues discussed there appears to be relatively consistent evidence that social reasons play an important role in the motivation to use substances for individuals with BD. There is also some evidence to suggest that enhancement plays a part in motivation for substance use for some, specifically in achieving or maintaining mania. There is extensive support for some form of self medication of symptoms, though it appears that there is also a considerable tendency to medicate symptoms not specific to BD. Given that experience of elevated mood is one of the key symptoms to distinguish BD from other diagnosis, it seems sensible that coping reasons are examined with specific reference to mood fluctuations.

Currently there is little understanding of how reasons differ depending on an individual's substance of choice, such as whether it is more likely that alcohol is used to cope with low mood or cannabis is used to reduce symptoms of mania. The most common substances of abuse in individuals with BD are alcohol and cannabis (Regier et al., 1999; Chengappa et al., 2000), yet research reviewed has often focussed on other substances such as heroin, or groups 'drug users' together in one sample.

The lack of one validated tool to measure reasons for substance use makes comparison between studies difficult. The majority of studies reported provide participants with reasons for substance use and ask if they have ever used substances for that reason. This method could be considered to lack validity as it possible that the concept of 'reasons' for substance use is one familiar to researchers in the area, however not necessarily an issue previously considered by the individuals who take part in research. Participants should be guided and supported to ensure the responses they give to researchers are accurate and truly reflect their experiences.

Furthermore, research with individuals with BD has so far neglected to effectively explore relationships between reasons for use and amount/ patterns of use. Where links have been made they are hypothetical and require further investigation.

1.9 Substance use experiences in bipolar disorder

To overcome some of the gaps identified in this area of research, a method for collecting data on reasons for use which presents the whole range of possible experiences related to substance use and allows for the idiosyncratic nature of experiences between individuals (Healey et al., 2009) is required.

One study to have done just this in a psychosis sample used Q methodology (Stephenson, 1953) to elicit patterns of self reported reasons for substance use (Gregg et al., 2009a). Q methodology (Stephenson, 1953) is a method of sorting a set of subjective statements (i.e. experiences of

substance use) into those which apply to the participant the most and those which apply the least. As such, this method enables subtle patterns and differences between participants to be examined. Principal Component Analysis (PCA) can then be employed to correlate patterns between participants' responses.

As noted, the results of Gregg et al (2009a) led to the development and validation of a scale of reasons for substance use in schizophrenia (the ReSUS scale; Gregg et al., 2009b) in a sample of 230 participants with psychosis. Principal component analysis of the scale revealed three subscales; firstly providing validation of the 3 factor solution presented in the Q study (Gregg et al., 2009a) and, secondly demonstrating in a larger sample how the reasons for use subscales: 'coping with distressing emotions and symptoms', 'social enhancement and intoxication' and 'individual enhancement' were associated with psychopathology and substance use.

Another research group, investigating cannabis use and its potential links with vulnerability to psychosis have developed a measure to enable a quantitative investigation of subjective cannabis use experiences (Cannabis Experiences Questionnaire; CEQ, Stirling, Barkus, Drake & Hopkins, 2011). An extensive list of experiences was gathered from two literature searches; the first gathering the self reported experiences of cannabis use and the second of signs and symptoms of the mind altering effects of cannabis use, focussing on reports of cannabis psychosis and amotivational syndrome (Johns, 2001). These experiences initially appeared to form two sets divided by their positive or negative implication and were presented to a group of 62 regular cannabis users who were asked to report the extent to which they felt they could relate to the listed experiences. Fifty six per cent of respondents reported a positive effect of cannabis use, while 32% endorsed negative effects. Authors noted that the majority of negative experiences tended to occur as an after-effect of cannabis use (in the 24 hours following use) rather than an immediate effect (while using cannabis). This finding led the developers to discriminate between immediate experiences of use (positive and negative) and after-effects, the latter of which became apparent to the user after the acute effects of use had ceased (Stirling et al., 2011). Test re-test analyses suggested that all three subscales of the CEQ were reliable (Stirling et al., 2011). Furthermore, implementation of this experiences scale in a sample of 477 respondents revealed that, for participants who reported any past or current cannabis use (n=332), schizotypy was associated with psychotic like experiences not only during, but also after cannabis use. The temporal differentiation between experiences may be extremely relevant clinically as there may well be discrepancy between the reasons individuals provide for using substances, and the effects they experience as a consequence of use.

A method which allows participants to freely consider all possible experiences of substance use in relation to each other would provide the opportunity to explore whether any patterns exist in substance use experiences. A greater understanding of individual experiences may provide some clarification as to why higher levels of co-morbidity exist in individuals with BD than in other

clinical groups. Moreover, exploration of the reasons for substance use in relation to the after-effects of use may inform treatment development by providing deeper understanding of perceived positive and negative consequences of use.

Furthermore, research which can provide clarity as to whether type or amount of substance used is linked with experiences of use has been suggested in the general population and psychosis samples may equip clinicians to identify BD individuals at high risk of negative outcomes.

1.10 Rationale of the study

The general aim of this study was to explore the substance use experiences of individuals with BD. Substance use is common for individuals with BD, and outcomes are reported to be more negative than for those individuals with BD who do not have a co-occurring SUD. However, no one explanation for the co-occurrence provides a thorough understanding of these findings.

Research investigating self reported reasons for substance use may provide greater understanding for the co-morbidity, though few such studies exist and findings so far are variable. Reasons for this variability could include small or mixed samples, differences in sampling for BD and SUD criteria, and the methods and measures used to collect data.

Research in other areas, such as the general population, have concluded that social reasons for substance use are related to moderate drinking, and coping related reasons for use are related to heavier drinking (Abbey et al., 1993; Cooper, 1994;). Similar findings have recently been reported in psychosis samples (Spencer et al., 1992; Gregg et al., 2009b), yet no such exploration has been conducted in a BD sample. Hence, the study to be reported aims to explore substance use experiences for individuals with a diagnosis of BD who regularly use substances.

1.11 General Aims

Stage 1

1. To explore reasons for substance use in a sample of participants with BD using Q methodology (Stephenson, 1953).

2. To explore the after-effects of substance use in the same sample using Q methodology (Stephenson, 1953).

Stage 2

Without any *a priori* hypothesis, a subsequent objective of this study was to examine the results of the above Q studies further. No hypotheses were possible at this stage of the research, because patterns in reasons for use and after-effects of use were yet to be identified. Furthermore, as previously noted, although research with other clinical groups indicates a link between reasons for use and details such as amount of substance use, no research directly supports this link in BD.
Should analysis of the stage 1 provide evidence for clusters of reasons and after-effects of substance use, the following research questions will be investigated.

- Is there support for a link between reported reasons for substance use/ after-effects of substance use and demographic details such as age, gender and education?

- Is there support for a link between reported reasons for substance use/ after affects of substance use and psychiatric symptoms such as depression and mania?

- Is there support for a link between reported reasons for substance use/ after-effects of substance use and substance use details such as specific substance used, level of use and period of time used at level?

CHAPTER 2:

Method

2. Method

The following chapter provides details of the processes involved with setting up and conducting the study. A brief explanation of the context of the research is provided, followed by details of design, participants, recruitment and procedure. Finally, an overview of the measures employed is presented, followed by a plan for statistical analysis.

2.1 Study context: The PARADES programme

The study presented in this thesis took place as part of the NIHR funded PARADES programme (Psychoeducation Anxiety Relapse Advance Directives Evaluation and Suicidality) with which the author was employed as a research assistant.

The PARADES programme focuses on the development, evaluation and implementation of psychological interventions for bipolar disorder (BD) and co-morbid problems. The programme consists of five work streams including an RCT of group psycho-education; a treatment development study for anxiety in BD; an exploration of factors involved with suicide and severe self harm in BD; an investigation of how the mental capacity act is impacting on the treatment experiences of individuals with BD and a treatment development study for people with BD and co-morbid substance use.

The latter work stream is made up of three phases:

- Phase 1 consisted of 2 related studies.
    i. Study 1 (the current study) set out to explore the experiences of substance use of individuals with BD using Q methodology and
    ii. Study 2 used the 'Experience Sampling Method' (ESM; Delespaul, 1995; De Vries, 1992) to examine cannabis use and its effects on symptoms and mood in people with BD. This project was the final year research project undertaken by, Elizabeth Tyler (ET), Trainee Clinical Psychologist.
- Phase 2 was a consultative phase in which individuals with bipolar experiences indicated ways that substance use interventions might be made relevant to people with BD.
- Phase 3 is a pilot RCT testing the feasibility and acceptability of a psychological therapy developed specifically for individuals with co-morbid BD and harmful alcohol use and is currently in progress.

For both studies in phase 1 of the BD and substance use work stream described above, recruitment was coordinated by the author. All eligible participants referred to the studies completed study 1, and if they reported current cannabis use, were invited to go on to complete part 2. Approvals and documentation related with both studies were combined and participant

documentation throughout relates to both studies. For all combined documentation, see appendices 2 – 8.

2.2 Design

The study consisted of two separate stages:

2.2.1 Stage 1: Q methodology

The main aim of the study was to explore experiences of substance use by individuals with a diagnosis of BD. This was achieved using Q methodology (Stephenson, 1953). Q methodology is a method of sorting a set of subjective statements into those which apply to the participant the most and those which apply the least. The method enables subtle patterns and differences between participants' responses to be examined.

In the current study, Q methododology was use to explore i) self reported reasons for; and ii) self reported after-effects of substance use.

Initially the two sorts (reasons and after-effects) were analysed using a dedicated software programme (PQ method: Schmolck, 2002) to explore any patterns in the ways participants sorted their reasons for and after-effects of substance use. Later, Q analysis was repeated on both sorts with participants broken into two subgroups according to the substance they reported to be their most problematic substance (MPS; alcohol or cannabis).

This process led to a further four Q sort analyses, resulting in a total of six analyses:

1. Reasons for use – Whole sample (n = 50)
2. Reasons for use – Alcohol subgroup (n = 29)
3. Reasons for use – Cannabis subgroup (n = 21)
4. After-effects of use – Whole sample (n = 50)
5. After-effects of use – Alcohol subgroup (n = 29)
6. After-effects of use – Cannabis subgroup (n = 21)

2.2.2 Stage 2: Q sort subgroup investigation

Dependant on the analysis of results from stage 1, stage 2 was a cross-sectional, between groups design investigating the demographic, clinical and substance use characteristics of participants belonging to clusters according to their self reported reasons for and after-effects of substance use. These analyses were initially carried out on the whole group sorts, then the same process was carried out on each of the four subgroup analyses, though due to sample size, are presented as preliminary.

2.3 Q methodology

The Q sort methodology was selected as it provides a means of sorting a set of subjective statements according to personal experience so allows participants to consider many statements before selecting the ones which apply to them the most and the least. The method has been used previously with individuals with serious mental illness in one study investigating service user experiences of neuroleptic medication (Day, Bentall & Warner, 1996) and another investigating experiences of hearing voices (Jones, Guy & Ormrod, 2003). Furthermore it has recently been employed in a sample of individuals with psychosis to explore reasons for substance use (Gregg et al., 2009a) demonstrating its appropriateness for the area of research.

2.3.1 Development of the Q Concourse

The first step towards developing a Q methodological investigation is identifying the Q concourse (Van Exel & De Graaf, 2005); the information available regarding the topic of investigation, in this case experiences of substance use self reported by individuals with BD. The concourse can be derived from a wide range of sources including literature already available on the topic, themes relevant to the topic of investigation or specific interviews with relevant individuals or groups (Van Exel & De Graaf, 2005). The main aim at this stage is to represent the widest possible views on a topic.

For this study, three such sources were identified:

- A review of existing literature eliciting reasons for substance use given by individuals with BD
- A set of semi structured interviews carried out for a previous qualitative study (Healy et al., 2009) where individuals with BD were asked to discuss their reasons for substance use (n=15)
- Therapy audio tapes taken from a pilot study of integrated psychological treatment for substance use in BD (n=5) (Jones et al., in press)

2.3.1.1 Literature Review

As reported in the introduction, a literature review of studies providing self reported reasons for use by individuals with BD was conducted by the author. In total 16 studies were identified.

Nine studies provided diagnostic information and included at least 20% of individuals with BD in the sample, and were reviewed in earlier sections of this thesis (Bizzarri et al., 2007a; 2009; 2007b; Bolton et al., 2009; Healy et al., 2009; Morriss et al., 2011; Warner et al., 1994; Sonne et al., 1994; Weiss et al., 2004.)

A further seven studies referred to participants with 'severe mental illness', 'psychiatric patients', or 'dually diagnosed' patients (Bergman & Harris, 1985; Green et al., 2004; Henwood & Padgett, 2007; Laudet et al., 2004) or included numbers of participants with a BD diagnosis comprising less than 20% of the sample (Baker et al., 2002, reporting a 8.5% BD sample; Bernadt & Murray, 1986, reporting a 10% BD sample and Spencer et al., 2002, reporting a 12% BD sample). For the development of the Q concourse these studies were included.

From these studies, the author extracted all reasons for substance use reported or discussed. The majority of these reasons were provided in the form of a list in the results section of each paper, so were directly lifted and added to the concourse. Single items were removed if they were duplicates of others.

This search generated a final list of 164 reasons for use which were extracted and added to the Q concourse (see appendix 10 for the full list).

2.3.1.1.1 Reasons, expectancies, effects and experiences – the conceptual overlap

It became apparent from examining what were described as self-reported 'reasons' for substance use in the literature that the term 'reason' was used to cover several concepts. A number of statements extracted could be clearly defined as a motivation for substance use, due to the method by which they were generated, for example some studies directly asked participants why they typically initiated substance use (e.g. 'when experiencing racing thoughts'; Weiss, 2004); others were more appropriately termed expectancies (e.g. 'to improve mood', Bizzarri, 2007b) and others described the direct effects of substances ('drug intoxication effects', Baker, 2002). For this reason, these statements were termed 'experiences', where 'experience' is defined as:

A reason for, expectancy of, desired effect, after-effect or consequence of substance use.

Searches in the following two sources (qualitative interviews and therapy tapes) were widened to capture substance use 'experiences' as defined above.

2.3.1.2 Qualitative Interviews

The full set of 15 transcripts from a qualitative study of reasons for use in BD (Healy et al 2009) were obtained from the authors. The author read through each transcript and identified all statements related to substance use which could be considered an 'experience' of use. The initial list of experiences extracted from the transcripts yielded 150 statements, of which 55 were immediately removed by the author due to exact duplication of reasons from the literature. The process of checking statements against those already present in the list was performed using a keyword search for each statement as it was added, for example, before adding the statement 'I feel more confident', 'confident' was searched in the existing list to reveal related statements. If

the statement was already present in the list, it was not added. The 98 new statements identified in the transcripts were added to the Q concourse.

2.3.1.3 Therapy tapes

A series of audio taped therapy sessions with clients taking part in a pilot study of an integrated psychological treatment for co-morbid BD and SUD (Jones et al., in press) who consented to taping were listened to by the author. The intervention employed motivational interviewing with five participants, who were currently using alcohol or cannabis, in order to identify key life goals and concerns making initial connections between problems and substance use, before the formulation of an individual change plan using cognitive behavioural techniques to support clients to reduce substance use and achieve goals. In total, 20 therapy sessions were available from four different therapist/client relationships. Each therapy session lasted for approximately 1 hour. The author identified all statements describing 'experiences' of substance use. A total of 68 statements were extracted from this source. Repeating the process described earlier, each statement was compared with the existing list and duplicate statements were not included. Thirty four experiences had not been identified in the literature or the interview transcripts and so were added to the Q concourse.

2.3.2 Development of the Q sets

The final Q concourse consisted of 296 'experiences' of substance use (see appendix 10 for listing). A team of clinical psychologists (Professor Christine Barrowclough, Professor Steven Jones) and the author met to examine this list of experiences.

An issue which became apparent during this planning stage was that some 'experiences' extracted implied immediate effects, (e.g. 'to fit in with friends', Laudet et al., 2004) when others reported what could be more accurately described as consequences or after-effects of use ('use to decrease manic symptoms', Sonne & Brady, 1994; 'substance improved overall functioning' (Bizzarri et al., 2009).

As noted earlier, a research group investigating cannabis experiences (Stirling et al., 2011) describe the clinical relevance of differentiating between the immediate experiences of substance use and the after-effects of that use. Based on this finding and the representation in the list of 'experiences' generated for this study, the decision to separate this list of 'experiences' by temporal implication was made.

The first set was termed 'reasons' which included those experiences that implied immediate effects. The second set was termed 'after-effects' which included statements which implied delayed or after-effects of substance use. Appendix 10 demonstrates which statements were placed into each sort.

This process resulted in a total of 209 'reasons' (sort 1) and 87 'after-effects' (sort 2). The two sets of statements were condensed according to similitude by the same working group. [1]

The final sets of statements included 41 'reasons' for substance use and 40 after-effects of substance use. For consistency, all statements in both sets were carefully reworded as 'experiences', for example in sort 1, 'to decrease restlessness' became 'makes me less restless' and in sort 2 'ability to concentrate' became 'I can concentrate better'.

In summary, 2 sorts were derived:
Sort 1: Reasons for substance use; a final set of 41 statements were agreed upon.
Sort 2: After-effects of substance use; a final set of 40 statements were agreed upon.

For the list of after-effects, statements were checked for a balance of positive and negative statements. For example, 'I feel better' was considered a positive after-effect, and 'I feel ill', negative. A total of 16 after-effects were considered to be negative, 12 positive and 12 could have been considered as either positive or negative.

2.3.3 Service User Consultation

A consultation was held with the Service User Reference Group (SURG) held at the Spectrum Centre for Mental Health Research, Lancaster University. This reference group is available to offer advice and support to researchers in the PARADES programme and consists of a total of nine members with personal experiences of BD. On the day of the consultation, five members of SURG were present, two of whom had direct experience of substance use, one personally and another as a carer. The author provided an overall introduction to the research and explained the process involved with conducting a Q study. Both sets of statements were presented and the group were asked to provide feedback on the wording of the statements. The aim of the consultation was to elicit an overall opinion of the applicability of the study and to ensure that statements were accessible to a majority of potential participants.

Suggestions were made for the adaption of four statements in sort 1, and two statements in set 2. One of the suggested adaptions in sort 1 was to exchange '*reduces my inhibitions*' with '*makes me less inhibited*'. The group also felt that the statement '*helps me go along with others when pressured to*' would be better worded '*helps me go along with others*' however on reflection, the research group felt it necessary to include '*when pressured to*' to capture an element of pressure to use substances.

[1] The decision was made at this stage to include only internal experiences (such as 'I feel calm' and exclude external experiences such as 'because it's cheap' in order to fully understand experience in relation to mood rather than other factors such as environment and finance. See appendix 10 for external experiences which were removed from the list.

For the after-effects set, it was suggested that '*stops me going high/ euphoric*' became '*stops me going high/ elated*' and '*I feel impulsive/ un inhibited*' became '*I feel disinhibited*'.
The reference group were also consulted regarding the balance of positive and negative statements in the after-effects set. The group unanimously agreed that 16 of the statements were negative experiences, 12 were positive and a further 12 could be considered either positive or negative. It was decided that this was an acceptable balance of statements for the study.

2.4 Study approval

The study was granted ethical approval by The North West Research Ethics Committee – Liverpool East. Permission to recruit within NHS Mental Health Trusts was granted by each trust individually, and a total of ten trusts were approached including Manchester Mental Health and Social Care Trust, Greater Manchester West Mental Health NHS Foundation Trust, Pennine Care NHS foundation Trust, Cumbria Partnership Foundation Trust, Cheshire and Wirral Partnership NHS Foundation Trust, 5 Boroughs Partnership NHS Foundation Trust, Mersey Care NHS Trust, Lancashire Care NHS Foundation Trust, Nottinghamshire Healthcare NHS Trust and Rotherham, Doncaster and South Humber Mental Health NHS Foundation Trust. Approval to recruit was granted by all trusts excluding Mersey Care NHS Trust. A copy of the letter granting ethical approval and an example of an approval letter from the lead Research and Development Trust, Manchester Mental Health and Social Care Trust is available in appendices 7 and 8.
Voluntary organisations and self-help groups in the North West were approached by the author and provided with information about the study.
The study was adopted by the Mental Health Research Network, UK which provided support with recruitment in Manchester Mental Health and Social Care Trust and Greater Manchester West Trust in the form of Clinical Studies Officers who supported the author to liaise with clinical teams within those trusts, arranging approximately eight team presentations for the author in community mental health teams.

2.5 Participants

Below is information relating to the chosen sample size followed by an outline of study inclusion and exclusion criteria and a description of the recruitment procedures.

2.5.1 Sample size

Q methodology applies factor analysis with participants as variables and statements as responses. The method clusters participants according to the ways in which they have sorted the statements (arrays). The number of participants required is influenced by the notion of 'finite diversity'. The methodology aims to find no more than 1 -5 'cases' for each view point

represented by sorting order and it is expected that a maximum of 7 viewpoints will be evident on any 'broad range topic' (Stainton Rogers, 1995). This considered, a sample size of 50 is considered appropriate.

"*Within Q methodology, the breadth and diversity of the participant sample are considered more important than proportionality.*" (Brown, 1996).

In order to recruit as broad and diverse a sample as possible, participants were recruited through a wide range of services including statutory and non-statutory mental health organisations. The study was also advertised in various mental health publications and self-referrals were accepted.

2.5.2 Inclusion/ exclusion criteria

2.5.2.1 Bipolar disorder inclusion criteria

- BD I or II as assessed by the structured clinical interview for DSM-IV disorders (SCID, First, 1996)

2.5.2.2 Substance use inclusion criteria

- Alcohol use exceeding 28 units for males and 21 units for females on at least half of the weeks of the previous three months or
- Use of cannabis at least two times per week in at least half the weeks in the three months prior to assessment.

This level of alcohol use was specified as it indicates consumption over the weekly government recommend levels (Inter-Departmental Working Group, 1995) and requires regular alcohol use yet still includes those participants who drink in heavy binge periods as opposed to daily.

The level of cannabis use specifies a regular use of cannabis and excludes those who may have used cannabis for short periods or experimentally.

According to The Structured Clinical Interview for DSM-IV Disorders (SCID, Research version, First et al, 1997) a diagnosis of substance abuse/ dependence requires an individual to self-report the current harmful effects (see SCID criteria, appendix 1). For this reason, the decision to include participants based on amount of use as opposed to DSM-IV (APA, 2000) criteria for abuse or dependence was made to ensure that those individuals who report or associate no harmful effects of substance use were included.

Due to the high levels of alcohol and cannabis use reported in individuals with BD, the decision was made to recruit those using these two substances primarily. Some participants referred were actively using other substances and these individuals were recruited provided they considered alcohol or cannabis use to be their most problematic substance (MPS). If participants reported alcohol and cannabis use at the time of referral, when they entered the study, they were asked to consider which of the two they felt was their MPS and then were asked to conduct the Q sort procedures according to their use of that substance.

2.5.2.3 General inclusion criteria

- Current contact with health services.
- Aged 18 years or older.
- Having a fixed abode.

2.5.2.4 General exclusion criteria

- Presence of current manic, hypomanic, mixed affective or major depressive episode currently or within 4 weeks, although it is expected that most participants will have sub-syndromal mood symptoms; as assessed by the SCID.
- Current suicide plans or high suicide intent, as assessed by specific questions in the SCID relating to presence of suicidal thoughts, plans or attempts.
- An inability or unwillingness to provide written informed consent to the study.
- An inability to communicate in written and verbal English to a sufficient level to allow participants to complete the measures and the Q sorting procedure.
- Evidence of organic brain disease or learning disability.

2.6 Recruitment

In order to recruit a representative sample for this study, presentations were delivered to a wide variety of mental health services and self help groups.

2.6.1 NHS Mental Health Services

A total of 71 teams within NHS secondary care mental health services including community mental health teams, assertive outreach teams, crisis home treatment services, early intervention services, community alcohol and drug teams and older adult services were approached across a 14 month recruitment period which ran from March 2010 – May 2011. In the 70 teams who offered support, the author requested a short slot at the team meeting to describe the study. Following presentation, team members were provided with posters and participant information sheets which they were asked to pass on to clients who were eligible. If a client showed interest in taking part in the study, the team member was asked to seek their permission to pass on contact details to the research team, who sent them a participant information sheet by post if they had not already received one, and answered any questions over the phone. If participants were happy to continue, a pre-screen interview was conducted by telephone to indicate eligibility, and an appointment to meet with the researcher was arranged either at their home, or at a location of their choice (GP surgery or mental health service).

The participant information sheet, referrer information sheet and study posters can be found in appendices 2, 3 and 4.

2.6.2 Voluntary/self help Services

Researchers also contacted voluntary support services such as Addiction Dependency Solutions, Crime Reduction Initiative, and Lifeline and self help organisations such as The Bipolar Organisation (MDF), Poles apart - a user led group in North Manchester, a user led 'dual diagnosis group' held at The wellbeing Centre, Stockport, and the Mood Swings Network. The author delivered presentations to staff and service users in these organisations, and received client referrals from staff as well as self-referrals. Following referral, the above procedure applied.

2.6.3 PARADES participant panel

Participants were also recruited from other studies within the PARADES programme. This only took place if participants had previously consented to have their details added to the 'participant panel', a secure database held at the Spectrum Centre for Mental Health Research, Lancaster University. The author sent out covering letters (see appendix 5) and participant information sheets to 60 members of the panel and provided contact details and instructions for self-referral.

2.6.4 Other sources of advertisement

Newsletters/ public advertisements: Advertisements were placed in a newsletter generated by the Spectrum Centre, Lancaster University, and a small advert for the study was placed in Pendulum, an MDF publication.

University of Manchester research website: A description of the study was placed on the University research opportunities website, which produces an electronic mail out with information to staff and students about research currently recruiting.

2.7 Procedure

Following referral by self or mental health worker, a pre – screen interview was conducted with potential participants by telephone to indicate eligibility for the study. Once completed, a time was arranged for the researcher and participant to meet and if this was to take place in the participant's home, as was in most cases, a risk assessment (see appendix 6) was completed with a worker involved in the participant's care. In the first visit, the researcher would ensure the participant had read and understood the participant information sheet and answer any questions.

2.7.1 Study assessments

Written informed consent was obtained for all participants (appendix 9) before the administration of the study assessment measures. Assessment measures included The Structured Clinical Interview for DSM-IV Disorders (SCID, Research version, First et al, 1997) which incorporates an

overview section eliciting demographic information. The Hamilton Depression Rating Scale (Hamilton, 1960); The Bech-Rafaelsen Mania Rating Scale (MRS; Bech, Rafaelsen, Kramp & Bolwig, 1978) and the Opiate Treatment Index (OTI; Darke, Ward, Hall, Heather & Wodak, 1991) were integrated into the relevant sections of the SCID interview to avoid repetition. Two self-report measures of mood (Internal State Scale, ISS, Bauer, Crits-Christoph, Ball & Dewees, 1991 and Patient Health Questionnaire 9, PHQ 9, Spitzer, Kroenke & Williams, 1999) were completed on the day of the Q sort procedure. A full description of study measures is provided in Measures, section 2.8, page 61).

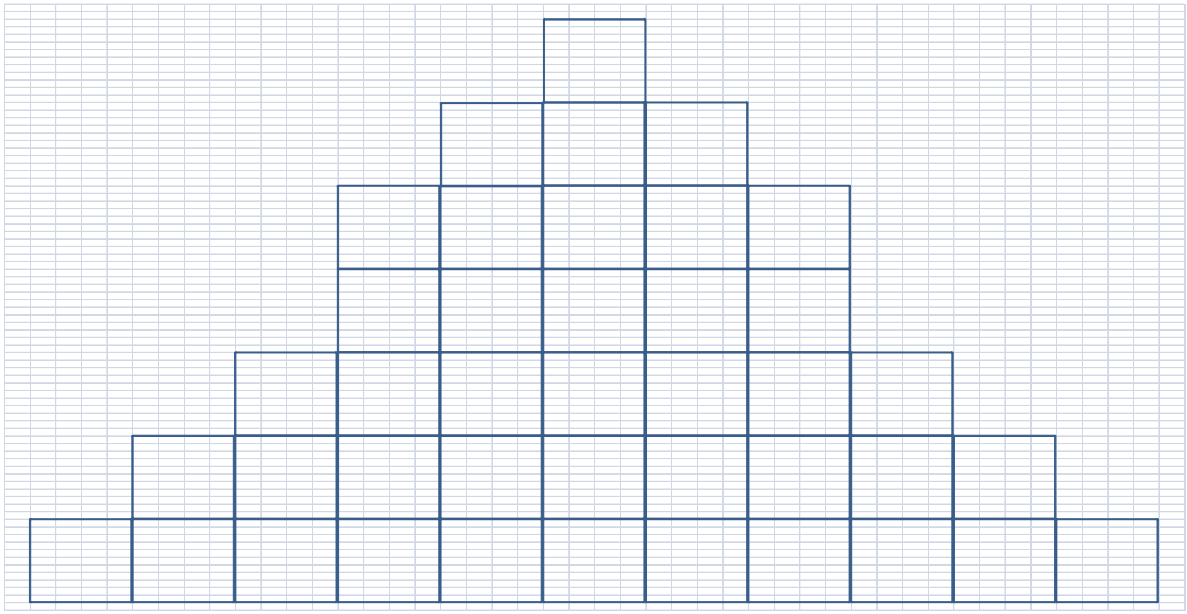
The assessment process generally filled one appointment; however participants had the option to spread the assessments across 2 appointments, if preferred. Initial assessments ranged from 60 - 200 minutes depending on participants' experiences and interview pace. In total, nine participants elected to spread the assessments over two appointments, and one participant requested four appointments to complete the assessment measures due to preferring short appointments. If the assessment measures were conducted in a separate appointment to the Q sort procedures, the researcher endeavoured to meet with the participant again within seven days. There were only two instances where this was not possible due to cancelled appointments and in these instances there was a 10 and 13 day gap between assessment and Q sort procedure.

2.7.2 The Q sorts

Participants were informed that they would be asked to sort two sets of statements relating to substance use – the first relating to their reasons for using their MPS (alcohol or cannabis), and the second relating to the after-effects of using that substance.

The researcher introduced participants to the response grid which was placed on a table or the floor in front of the participant. See Figure 1, page 59 for a diagram of the response grid used for both sorts. In all cases, sort 1, relating to reasons for use was conducted first, and sort 2, relating to after-effects was conducted second.

The author gained consent to write down verbatim anything that participants said in relation to the statements as they sorted them onto the grid which were later used in the interpretation of results.



Applies to me the least Applies to me the most

Figure 1: Q sort response matrix

2.7.2.1 Sort 1

Participants were presented with the first set of 41 statements in random order and were informed that all of the statements were reasons for substance use given by others with a diagnosis of BD.

The condition of instruction was given verbally to each participant and was as follows:

"Order the statements onto the response grid according to your reasons for using substance (X) by placing the statements that you feel apply to you the most on the right hand side of the grid, and the statements you feel apply to you the least on the left hand side of the grid"

Participants were allowed as much time as they wanted to look over all of the statements. To familiarise participants with the Q set, they were asked first to sort the statements into 3 piles: Firstly, statements which they felt they could relate to, secondly statements they did not feel applied to them and finally any 'neutral' statements which they were not sure about or for which they had no strong feelings in either direction. Next, sorters were asked to consider their 'applies to me' set, and from this, identify the one statement they felt applied most strongly. This statement was placed in the far right space on the response grid. Next, sorters were asked to identify the two statements which they felt came next in terms of relevance or importance to them, and these were placed in the next column. This process was repeated until all statements from the 'applies to me' pile were placed on the grid.

Participants were then asked to consider their 'applies to me the least' pile and repeat the process starting with the statements they felt applied to them the least, placing statements on the opposite side of the response grid. When all the statements in this pile were placed on the grid, participants were asked to consider any statements in their 'neutral' pile and place them accordingly in the centre of the grid. When the sorting procedure was finished, participants were given time to consider the way they had ordered the statements and were given the opportunity to make any changes if they wanted to.

When participants were happy with the positioning of the statements in sort 1, the researcher recorded the final positioning of the cards on a copy of the response grid. Participants were asked if they felt they used substances for any reasons which were not represented in the statements and if any new reasons were offered, details were taken by the researcher.

2.7.2.2 Sort 2

Participants were then presented with the second set of 40 statements, once again in random order and were informed that all of the statements were after-effects of substance use given by others with a diagnosis of BD.

The condition of instruction was given verbally to each participant and was as follows:

"Order the statements onto the response grid according to experiences you may have in the 24 hours following using substance (X) by placing the statements that you feel apply to you the most on the right hand side of the grid, and the statements you feel apply to you the least on the left hand side of the grid"

The sorting process described for sort 1 was repeated for sort 2. Participants were once again asked if they felt they had any experiences in the 24 hours following substance use which were not represented in the statements and if any new after-effects were described, details were taken by the researcher.

The participant was then debriefed. The researcher answered any questions participants had about the study and thanked them for their participation.

2.8 Screening and assessment measures

As noted, all study screening and assessment measures were conducted prior to data collection, with the exception of two self report measures of mood (ISS, Bauer et al., 1991; PHQ 9, Spitzer et al., 1999). Participants took part in a pre-screen interview to demonstrate their eligibility for the study by telephone. If the pre-screen interview indicated alcohol or cannabis use consistent with the study eligibility criteria, an appointment was arranged to meet.
Below is a description of all assessments and measures used in this study.

2.8.1 Pre-screen interview

Following referral, participants were asked to complete a pre-screen interview with the researcher by telephone. The purpose of this brief interview was to indicate a participant's eligibility for the study. The interview ensured participants had received the participant information sheet, elicited some brief details about their clinical diagnosis before going on to ask some brief questions about their experiences of high and low mood in the past, their mood state currently and their level of substance use in the past month.
A copy of the pre-screen interview is available in appendix 11.

2.8.1.1 Eligibility: Substance Use

During the pre-screen interview, participants were asked to describe their current level of alcohol and/ or cannabis use based on the following questions:
Have you drunk alcohol/ used cannabis in the past 7 days?

How many drinks have you drunk in the past 7 days?/ On each occasion how much cannabis have you smoked?

Is this a typical week for you?

If not, how many weeks in the past 3 months have you drunk at this level?

2.8.2 Eligibility: Psychopathology

The Structured Clinical Interview *for DSM-IV Disorders (SCID, Research version, First et al., 1997)*

Researchers administered the structured clinical interview in order to verify primary diagnosis of BD I or II and indicate presence of axis 1 co-morbidities. The SCID is a semi-structured interview widely used in clinical research due to its easy administration. The SCID was also used to assess the presence of current and past substance abuse or dependence as well as presence or history of psychotic symptoms, co-morbid anxiety disorders, eating disorders or personality disorders.

Researchers (NB, ET) received training to carry out the SCID with an experienced psychiatrist (Professor Richard Morriss) and received regular clinical supervision with the trainer and clinical psychologists within the PARADES programme (Professor Christine Barrowclough, Professor Steven Jones and Dr Fiona Lobban).

As well as using the SCID to confirm eligibility for the study, four variables derived from the assessment were used in stage 2 of analysis for this study: Number of previous depressive episodes; number of previous manic episodes; SCID diagnosis of alcohol disorder and SCID diagnosis of cannabis disorder.

2.8.3 Demographics

Demographic information was elicited as part of the SCID overview interview.

Participants were asked about their age, ethnicity, marital status, living arrangement, level of education completed, current working status, type of work and parental status.

Six variables derived from the overview were used in stage 2 of the study: Age, marital status, living arrangement, education completed, current working status and parental status.

2.8.4 Current mood ratings

In order to explore relationships between substance use experiences (results from the Q sort analyses, stage 1), and current mood, a number of measures were selected to provide a range of self and observer rated mood ratings.

2.8.4.1 Observer rated measures

2.8.4.1.1 Hamilton Depression Rating Scale (HDRS; Hamilton, 1960)

The HDRS is an observer rated measure based on clinical observation that assesses seventeen symptoms of depression. Total HDRS score can be categorised as follows: <10 (no depression),

10-13 (mild depression), 14-17 (mild to moderate depression) and >17 (moderate to severe depression). The HDRS questions were incorporated into the mood section of the SCID to avoid repetition.

Studies using the HDRS in BD samples have reported the internal consistency reliability at 0.86 (Leidy, Palmer, Murray, Robb and Revicki, 1998). Both researchers scored a random sample of HDRS (10%) to assess inter-rater reliability. The intraclass correlation coefficient between the two raters was 0.98.

One variable derived from the measure was used in stage 2 of analysis (HDRS score: range 0 – 52).

2.8.4.1.2 The Bech-Rafaelsen Mania Rating Scale (MAS Bech et al., 1978)

The MAS (Bech et al., 1978) is a widely used observer rated measure that assesses for eleven symptoms of mania or hypomania based on observations during clinical interview. The total MAS score can be categorised as follows: 0-5 (no mania), 6-9 (hypomania), 10-14 (probable mania) and >15 (definite mania). This was also incorporated into the mood section of the SCID to avoid repetition.

The reported internal consistency for the MAS is 0.90 (Bech, 2002). Both researchers scored a random sample of MAS (10%) to assess inter-rater reliability. The intraclass correlation coefficient between the two raters was 0.97.

One variable derived from the measure was used in stage 2 of analysis (MAS score: range 0 – 44).

2.8.4.2 Self report measures

2.8.4.2.1 The Internal State Scale (ISS; Bauer et al., 1991)

The ISS is a 15 item self-report questionnaire that assesses symptoms of mania and depression. It comprises four subscales including activation (ISS-ACT), perceived conflict (ISS-PC), well being (ISS-WB) and depression (ISS-DEP). Each statement is rated from 0 – 100 by the participant blackening circles along a 100m line (labelled 0, 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100) based on how they have felt over the past 24 hours. Participants were asked to complete this assessment on the same day of the Q sort procedure.

The subscale used as a variable for analysis in stage two of the current study was activation (ISS-ACT, score range 0 – 360). This subscale was selected as a measure of self reported (hypo)mania as previous studies have found that individuals currently in a manic phase score significantly highly on this subscale compared to those with euthymic or depressed mood. Furthermore, scores on the activation subscale have been shown to correlate significantly with established observer rating scales of mania (Bauer et al, 1991). A cut off score of 200 has been validated as indicative of the presence of (hypo)mania in previous studies with participants with BD (Bauer, Vojta, Kinosian, Altshuler & Glick, 2000).

The ISS has good internal consistency with alphas that range from .81 to .92 for the subscales (Bauer et al., 1991) and is a widely used measure of bipolar symptoms (e.g. Jones et al., in press; Jones & Day, 2008; Wright, Lam & Brown, 2008). A copy of the ISS can be found in appendix 12.

2.8.4.2.2 Patient Health Questionnaire, PHQ 9 (Spitzer et al., 1999)

PHQ 9 is a brief screening tool assessing self rated depressive symptoms to establish a self-report rating of low mood. PHQ 9 is a self administered version of the PRIME-MD, (The Primary Care Evaluation of Mental Disorders (Spitzer et al., 1994) and is presented to the participant in the form of 9 depression items from the full PHQ. The measure produces a final self reported severity score ranging from 0 to 27 with the sub scales 0 – 4 (minimal depression), 5 – 9 (mild depression), 10 – 14 (moderate depression), 15 – 19 (moderately severe depression) and 20 – 27 (severe depression).

The PHQ 9 is a widely used measure of self reported depressed mood with excellent reliability and validity. Previous Studies have reported reliability cronbach's alpha values of 0.89 (Kroenke et al, 2001). A copy of the PHQ 9 can be found in appendix 13.

Participants were asked to complete this assessment on the same day of the Q sort procedure.

One variable derived from the measure was used in analysis in stage 2 of the current study (PHQ score range 0 – 27).

2.8.5 Substance use

2.8.5.1 Opiate Treatment Index (OTI, Darke et al., 1991)

In order to explore relationships between current level of substance use and results from the Q sort procedure in stage 2 of analysis, the OTI (Darke et al., 1991) was selected to provide a range of substance use details.

The OTI is an assessment instrument developed to provide a comprehensive, standardised measure in opiate treatment research (Darke et al., 1991), has known psychometric properties (Darke 1992); and has previously been used to measure alcohol and cannabis use in psychiatric patients (Baker et al., 2006).

It covers several dimensions such as drug use, health, legal and social aspects of substance use.

This study employed the drug use domain of the OTI which can be used to calculate an estimated average daily consumption for 11 substances ranging from tobacco to heroin by examining the recent, self reported behaviour of the participant. In the current study, alcohol and cannabis use only were measured using the OTI.

For each drug class, the participant is asked when their 3 most recent days of substance use occurred and how much they used of the substance on the last 2 occasions. A simple calculation of amount / intervals between days used provides a single score or average daily consumption

for the past month: for alcohol, this score translates to units, and for cannabis, this score relates to instances of use (e.g. spliffs, uses of a pipe).

Example of OTI score calculation:

On what day did you last use cannabis?

On that day how many (spliffs, bongs, pipes) did you smoke? = *(Q1)*

On which day before that did you smoke cannabis? = *(T1)*

How many (spliffs, bongs, pipes) did you smoke? = *(Q2)*

On which day before that did you smoke cannabis? = *(T2)*

OTI score = Q1 + Q2/ T1 + T2

The OTI also collects several other substance use details such as number of days consumption in the past month, number of years use at current level and for alcohol, how many days in the past 28 participants have exceeded government recommended levels.

Five main variables derived from the OTI were used in stage 2 of the study:

1. Number of days used most problematic substance in past month (score range: 0 - 28)
2. Period of use (in years) at this level (0 >)
3. Number of days alcohol consumed in excess of government recommended levels in the past month (0 – 28)
4. OTI alcohol score (score range 0 >)
5. OTI cannabis score (score range 0 >) [2]

2.9 Statistical Analysis

2.9.1 Stage 1: Q analysis

Stage 1 of data analysis was performed using a dedicated software package (PQ method: Schmolck, 2002). Each participant's sort was entered into the software package, which employs principal component analysis. Varimax rotation then maximises the amount of variance explained by factors extracted by the programme and exemplary sorts are produced to represent each factor. The procedure identifies patterns in the way participants have sorted the Q set, producing a correlation matrix which groups people rather than items together. This process was carried out on the whole sample for each of the two sorts (Reasons for use and after-effects). This procedure was then repeated separately for each sort according to the participant's MPS, i.e. the group identifying alcohol as their primary substance (n= 29) was analysed separately to the group identifying cannabis as their primary substance (n=21) to explore any differences in reasons for and after-effects of alcohol and cannabis use.

[2] OTI alcohol and cannabis scores were only employed in stage 2 analyses for samples broken down by MPS (alcohol and cannabis) as it was not possible to compare OTI scores across the whole group due to the different units of measurement they represent.

2.9.2 Main reasons for use/ after-effects of use

Frequency counts are presented for each statement endorsed in the reasons sort and the after-effects sort. This demonstrates firstly which of the statements in both sorts are most commonly endorsed (placed on the right hand side of the response grid; +1, +2, +3, +4, +5) or not endorsed (placed on the left hand side of the grid; -1, -2, -3, -4, -5) by participants. Secondly, those statements most commonly placed in the 'relates to me the most +5' column in both sorts are presented. This process was performed for each of the whole group Q sorts, and again for sorts when broken down by MPS.

2.9.3 Stage 2: Q sort subgroup investigation

2.9.3.1 Cleaning the data and missing values

The entire data set was entered into a database in SPSS (V16.0) by the author. Prior to statistical analysis 10% of the database was checked by an independent researcher and no errors were identified.

Where data were missing, all available data were analysed and the sample size for each analysis is reported in the text or tables.

2.9.3.2 Distribution of the variables

For continuous variables being used in statistical analyses, data distributions were checked for normality. To do this, Z scores were calculated by dividing skewness and kurtosis values by their standard errors. If Z scores in either of these calculations fell outside of – 2 or +2, data were identified as not normally distributed. Z scores were calculated separately for all variables used in whole group analyses and subgroup analyses (alcohol and cannabis).

Where data were found not to be normally distributed, square root and log transformations were performed and distributions of the transformed variables were checked in the same way.

Where transformations were not successful, non parametric tests were employed. Distributions for all variables employed in the analysis section, and corresponding transformation data are presented in appendix 14.

2.9.3.3 Statistical tests

Stage 2 examined differences between participants loading on factors within all Q sorts, analysed in terms of demographic details, current mood ratings as collected by observer rating and self report scales; and substance use details.

To achieve this, Chi square was used where data were categorical. Where chi square showed a significant result for a variable with several levels, adjusted residuals in the cells were inspected (Haberman, 1973). Where expected counts in each cell were less than five, Fisher's Exact Test

(FET) is reported (Fisher, 1992). Fisher's Exact Test is a reliable way of computing the exact probability of the chi square statistic when sample sizes are small.

Independent *t* tests were employed to test for differences in sorts where data were normally distributed, continuous and Q analysis had produced two factors. One way ANOVA was used where data were normally distributed, continuous and Q analysis resulted in three or more factors.

Where transformations were not successful and data were not normally distributed, Mann-Whitney U tests were employed where two independent groups were compared, and Kruskal-Wallis tests used where there were more than two independent samples. Once again, where significant results were detected, post hoc comparisons using the Mann-Whitney U tests were conducted. In these instances, the required level of significance was adjusted for multiple comparisons (Bonferroni correction).

CHAPTER 3:
Results

3. Results

This chapter reports data from the final sample of 50 participants who completed the Q sort procedures. Results are presented as follows: A brief description of participant recruitment; demographic, clinical and substance use characteristics of the sample and finally descriptive frequencies of key variables. Next, the most frequently endorsed reasons for substance use are presented and the results of the Q sort investigating reasons for use are reported. Analyses examining whether there were any demographic, clinical or substance use differences between the groups identified by the analysis of the Q sorts are also included here.

The sample was then broken down into subgroups according to whether participants reported their most problematic substance (MPS) to be alcohol or cannabis. The most commonly endorsed reasons reported by each of the subgroups are presented, followed by the results of the Q analyses for both subgroups. Preliminary results examining differences between groups identified in the Q sort analyses are reported here.

Data from the second sort – after-effects of use, is presented last. Again, the most commonly endorsed after-effects are reported followed by the Q analysis of data from the whole sample. Demographic, clinical or substance use differences are examined. As before, the sample was then divided into two subgroups according to MPS (alcohol or cannabis) and the most commonly endorsed after-effects are presented for each group, followed by further Q analyses and exploration of differences between groups.
Finally, relationships between factors from the first and second sort are presented.

3.1 Recruitment

A total of 70 individuals were identified or identified themselves as eligible for the study and agreed to be contacted by the researcher. Of these; two self-referrals were out of area, two individuals were un-contactable following self-referral by email, nine declined participation following telephone discussion with the research team, and five were ineligible following pre-screen/ first meeting with the researcher due to being assessed as currently in episode, not meeting eligibility criteria for BD (bipolar disorder) or reporting substance use at a level lower than that specified in the inclusion criteria. A further two individuals dropped out of the study after consent and did not complete the Q sorts.

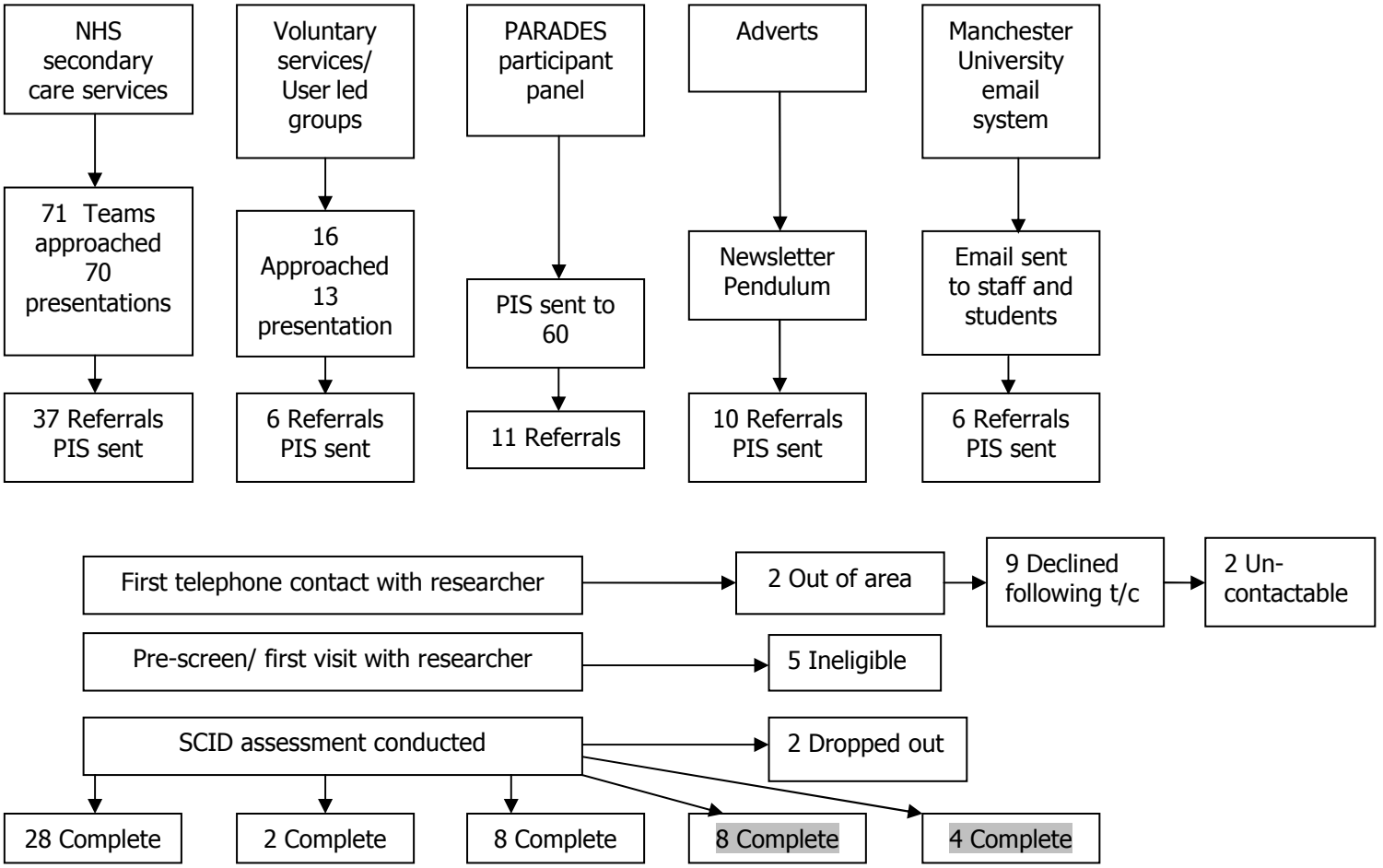


Figure 2: Recruitment flowchart

3.2 Sample characteristics

3.2.1 Demographic characteristics

As demonstrated in table 3, the final sample consisted of 28 males (56%) and 22 females (44%) with a mean age of 40.2 (range 19 – 69). The majority of participants were of White British origin (94%) and a large proportion of individuals were unmarried (82%). There was a relatively equal split in the sample regarding co-habitation, with just under half of all participants (46%) living with partners, friends, children or others and the remainder (54%) living alone. Half of the group (50%) reported having at least one child, and an equal number had no children (50%).

The majority of the sample had completed further education (60%), while 40% reported attaining GCSE/ equivalent or below.

Table 3: Demographic characteristics (*n* = 50)

Age:	
Mean (SD)	*40.2 (12.12)*
Range	*19 - 69*
	Frequency (%)
Gender:	
Female	22 (44)
Male	28 (56)
Ethnicity:	
White British	47 (94)
Other white background	1 (2)
Black Caribbean	1 (2)
White and Asian	1 (2)
Marital Status:	
Married or co habiting	9 (18)
Not married	41 (82)
Living arrangement:	
Living with partner/child/ other	23 (46)
Living alone	27 (54)
Education	
GCSE/ equivalent or below	20 (40)
Further education	30 (60)
Currently working	
Yes	10 (20)
No	40 (80)
Parental status:	
Parent	25 (50)
No children	25 (50)

3.2.2 Clinical Characteristics

All participants met DSM-IV criteria for BD I or II, and did not currently meet criteria for an episode of mania or depression. Table 4 presents the outcomes of the Structured Clinical Interview for DSM-IV Disorders (SCID; First et al., 1997).

A very large proportion of the sample (96%) met criteria for BD I and the remaining 4% met criteria for BD II. The SCID assesses a lifetime prevalence of co-morbid diagnosis, and also verified any current presence of co-morbid symptoms. Just over half of the sample reported experience of psychosis within a bipolar episode (either mania or depression) at some point in their past.

The most common current co-morbid anxiety related diagnoses were panic disorder (16%) and social phobia (16%). Relatively low levels of co-morbid eating disorders were detected in this sample, with current levels of binge eating disorder detected in only two individuals. Both borderline personality disorder and anti social personality disorder were present in 8% of the sample. Overall, just under half of the sample (44%) met criteria for a co-morbid anxiety, eating or personality disorder.

Additional diagnoses were not available for two participants in the sample. In one case, the participant requested as few mood related questions as possible due to potentially detrimental effects on her current mood. In this case, the interview was discontinued once a diagnosis of BD was confirmed and some questions around alcohol use had been asked. In the second, various attempts were made to contact the participant to complete the full SCID assessment, however due to circumstances, he disengaged following completing the essential measures and Q sort.

Table 4: Clinical characteristics (*n* = 50)

Clinical variable		Frequency (%)
BD subtype:	*BD I*	48 (96)
	BD II	2 (4)
No. previous episodes, depression:		
	(<7)	16 (32)
	(8 – 19)	11 (22)
	(>20)	16 (32)
No. previous episodes, mania:		
	(<7)	18 (36)
	(8 – 19)	8 (16)
	(>20)	18 (36)
No. previous episodes, hypomania:		
	(<7)	1 (2)
	(8 – 19)	1 (2)
	(>20)	0
History of psychosis (in episode):	*Yes*	28 (56)
	No	22 (44)
Co-morbid Anxiety Disorder:		
Panic Disorder	*(Absent)*	37 (74)
	(Past)	3 (6)
	(Current)	8 (16)
Agoraphobia	*(Absent)*	48 (96)
	(Past)	0 (0)
	(Current)	0 (0)
Social Phobia	*(Absent)*	39 (78)
	(Past)	1 (2)
	(Current)	8 (16)
Specific Phobia	*(Absent)*	41 (82)
	(Past)	1 (2)
	(Current)	6 (12)
Obsessive Compulsive Disorder	*(Absent)*	42 (84)
	(Past)	2 (4)
	(Current)	4 (8)
Post Traumatic Stress Disorder	*(Absent)*	40 (80)
	(Past)	3 (6)
	(Current)	5 (10)
General Anxiety Disorder	*(Absent)*	41 (82)
	(Past)	7 (14)
	(Current)	2 (4)
Co-morbid Eating Disorder		
Anorexia	*(Absent)*	46 (92)
	(Past)	2 (4)
	(Current)	0 (0)
Bulimia	*(Absent)*	45 (90)
	(Past)	2 (4)
	(Current)	1 (2)
Binge Eating Disorder	*(Absent)*	45 (90)
	(Past)	1 (2)
	(Current)	2 (4)
Co-morbid Personality Disorder		
Borderline Personality Disorder	*(Present)*	4 (8)
Anti social Personality Disorder	*(Present)*	4 (8)

3.2.3 Substance Use

All participants reported alcohol and/or cannabis use over the levels required in the eligibility criteria. For alcohol, this was use exceeding 28 units for males/21 units for females on at least half of the weeks of the previous three months, and for cannabis; use at least two times per week in at least half the weeks in the three months prior to assessment.

3.2.3.1 Substance use disorders

Those participants reporting both alcohol and cannabis use on entry to the study were asked to decide which substance they felt was the most problematic substance (MPS) for them at that time. For 58% of the sample, alcohol was reported as the MPS while for the remaining 42% this was cannabis. Diagnoses of alcohol and other substance use disorders were also determined using the SCID. As shown in table 5, of the participants reporting alcohol as their MPS, more than three quarters (79%) met SCID criteria for either current alcohol abuse or dependence. The alcohol subgroup showed relatively low levels of current cannabis abuse (0%) and dependence (14%) and 3% met current criteria for other, non cannabis substance dependence.

For participants reporting their MPS as cannabis (n=21) there was a much higher prevalence of current cannabis dependence (57%) or abuse (14%). Ten per cent of participants in this subgroup also met criteria for current alcohol dependence and a further 10% of the group met dependence criteria for other current, substance use.

Table 5: Prevalence of substance use disorders

		Full sample *(n = 50)*	***Alcohol subgroup*** *(n = 29)*	***Cannabis subgroup*** *(n = 21)*
Alcohol Disorder				
Alcohol Abuse	*(Absent)*	26 (52%)	13 (45%)	13 (62%)
	(Past)	12 (24%)	4 (14%)	8 (38%)
	(Current)	12 (24%)	12 (41%)	0
Alcohol Dependence	*(Absent)*	16 (32%)	5 (17%)	11 (52%)
	(Past)	21 (42%)	13 (45%)	8 (38%)
	(Current)	13 (26%)	11 (38%)	2 (10%)
Cannabis Disorder				
Cannabis abuse	*(Absent)*	46 (92%)	28 (97%)	18 (86%)
	(Past)	1 (2%)	1 (3%)	0
	(Current)	3 (6%)	0	3 (14%)
Cannabis Dependence	*(Absent)*	26 (52%)	21 (72%)	5 (24%)
	(Past)	8 (16%)	4 (14%)	4 (19%)
	(Current)	16 (32%)	4 (14%)	12 (57%)
Substance Disorder (other)				
Substance Abuse	*(Absent)*	40 (80%)	23 (79%)	15 (71%)
	(Past)	9 (18%)	6 (21%)	4 (19%)
	(Current)	1 (2%)	1 (3%)	2 (10%)
Substance Dependence	*(Absent)*	37 (74%)	22 (76%)	15 (71%)
	(Past)	10 (20%)	6 (21%)	4 (19%)
	(Current)	3 (6%)	1 (3%)	2 (10%)

3.2.3.2 Current substance use data

Further substance use details were collected using the drug use scale of the Opiate Treatment Index (OTI, Darke et al., 1991). Specific substance related questions were asked according to whether participants reported alcohol or cannabis as their MPS. Table 6 provides substance use data comparable across the whole group, and data comparable across subgroups when separated by MPS.

Distribution data for these variables is presented in table appendix 14.

Table 6: Substance use details collected by the Opiate Treatment Index (Darke et al., 1991)

Variable	*Minimum*	*Maximum*	*Median*	*Mean*	*SD*	*Variance*
Whole group substance use details (n = 50)						
No. days used MPS in past month	2.00	28	28	21.24	8.65	74.76
Period of use of MPS at this level (yrs)	0.12	30	7.50	9.10	8.03	68.96
Alcohol subgroup (n = 29)						
OTI Score: Alcohol	1.3	22.5	6.2	8.9	6.53	42.65
No. days used in past month	2	28	20	19.76	8.83	77.97
Period of use at this level (yrs)	0.12	25	6	7.85	7.53	56.73
No. days binge in past month	0	28	14	13.34	9.74	94.95
Cannabis subgroup (n = 21)						
OTI Score Cannabis	0.2	15	4	4.93	3.98	15.81
No. days used in past month	6	28	28	23.29	8.15	66.41
Period of use at this level (yrs)	0.12	30	10	10.82	9.17	84.16

Whole group data

Participants reported having used their MPS for an average of 21 days in the past month. They were also asked to estimate how many years they have used at the level they report, and this time ranged from 0.12 years to 30 years, the mean time being 9.10 years.

Distribution data for variables used in the whole group analyses (stage 2) are presented in table 14.1, appendix 14.

Alcohol use data: Alcohol subgroup

For those participants reporting alcohol as their MPS, alcohol use was reported on an average of 20 days in the previous month, however ranged from two days of the month to daily. The sample reported drinking at these levels for an average of eight years previous. When asked to estimate how many days in the past month they had consumed over government recommended levels reported an average of 13 days though some participants did not disclose any binge drinking days, while others drank at this level daily. OTI scores (average number of units per day) range from 1.3 – 22.4 with a mean of 8.9 units per day.

Distribution data for variables used in the alcohol subgroup analyses (stage 2) are presented in table 14.2, appendix 14.

Cannabis use data: Cannabis subgroup

Of the 21 participants who reported cannabis as their most problematic substance OTI scores ranged from 0.2 instances of use per day to 15 instances of use per day with a mean of 5 instances of use. When asked how many days in the past month they had used cannabis, the group reported a range from 6 to 28 days with a mean of 23 days. Participants reported a range from 0.12 years to 30 years, with a mean of 11 years of use at the reported level.

The type of cannabis that participants were smoking at the time of data collection was also collected. These included skunk (57%), resin (29%) and grass (14%).

Distribution data for variables used in the cannabis subgroup analyses (stage 2) are presented in table 14.3, appendix 14.

3.3 Symptom measures

Participant scores on symptom measures across the whole sample (n = 50) are reported in the table below.

Perhaps unsurprisingly, considering that the presence of a manic or depressed state was a reason for exclusion from the study, there were relatively low levels of variance in the measures used to assess high (Mania rating scale; MAS, Bech et al., 1978) and low (Hamilton rating scale for depression; HDRS, Hamilton, 1960) mood. For this reason, neither measure was normally distributed. Interestingly, self reported levels of high (ISS; activation, Bauer et al., 1991) and low (PHQ 9; Spitzer et al., 1999) mood were more normally distributed.

Distributions of these measures for the whole group and for each group separated by MPS are presented in table 14.1, appendix 14.

Table 7: Participant scores on symptom measures

Variable	***Minimum***	***Maximum***	***Median***	***Mean***	***SD***	***Variance***
HDRS Score	0	31	6.5	8.10	7.78	60.58
MAS Score	0	12	1	2.46	3.11	9.68
ISS (Activation)	0	360	150	156	91.50	8371.42
PHQ 9 Score	0	24	8	9.28	6.83	46.66

3.4 Reasons for substance use

3.4.1 Main reasons for substance use

Frequency counts and percentages for the number of times each reason for substance use was placed on the right hand side of the Q sort grid – suggesting positive endorsement of this statement are provided in table 8. For the whole sample, the most frequently endorsed reason for substance use relates to relaxing; placed on the right hand side of the response grid by nine out of ten participants (45; 90%). More than four out of five participants (41; 82%) endorsed use of alcohol or cannabis to make them feel calm and help them to switch off. Similar numbers (40; 80%) reported using alcohol or cannabis to make them feel good.

Three quarters of the sample endorsed substance use to help manage low mood (37; 74%), and several statements relating to managing high mood were also endorsed (to feel less restless, 31; 62%, to reduce racing thoughts, 27; 54%). Two thirds (33; 66%) reported using cannabis or alcohol to achieve an altered state of mind and 18 participants (36%) reported substance use as an aid to get/stay high/ elated.

Social reasons for use, such as 'makes me more sociable' (28; 56%) and use to boost confidence (27; 54%) were endorsed by approximately half of the group.

Each statement in the sort was endorsed by at least one participant, though several statements were endorsed far less frequently than others, indicating that they were less relevant or likely reasons for substance use. Some examples of statements which were far less commonly endorsed were to manage voices or visions – both of which were only endorsed by only two or four participants respectively.

The statements most frequently identified as the most important reason for substance use (as placed on the far right hand side of the response grid) were to manage low mood (reported as the most important reason for use by five of participants; 10%); to aid sleep (4; 8%) and to relax (4; 8%).

Table 8: Reasons for substance use most frequently endorsed by the whole sample (n = 50)

Reason for substance use (Q sort statement)	**No. endorsing each statement** *(+1, +2, +3, +4, +5)*	
	N	*%*
Helps me to relax	45	90
Makes me feel calm	41	82
Helps me to switch off	41	82
Makes me feel good	40	80
Reduces my anxiety	38	76
Helps me manage low mood	37	74
Alleviates boredom	37	74
Helps me to achieve an altered state of mind	33	66
Helps me feel less irritable	32	64
Makes me less restless	31	62
Helps me to sleep	30	60
Makes me more sociable	28	56
Boosts my confidence	27	54
Slows down my racing thoughts	27	54
Helps me cope with difficult/ painful memories	26	52
Makes me feel less alone/lonely	23	46
Satisfies my cravings/ dependency	23	46
Makes me feel normal	22	44
Helps me deal with problems	21	42
Reduces my inhibitions	18	36
Helps me get/stay high/ elated	18	36
Helps me to celebrate success	17	34
Increases my creativity	17	34
Fits into my routine/ lifestyle	17	34
Stops me feeling too high/ elated	16	32
Its helps me to think	16	32
Relieves physical pain	16	32
Enables me to join in with what family and friends are doing	15	30
Makes me more open to new ideas	14	28
Helps me manage my anger	12	24
Helps me to fit in	12	24
Helps me focus/ get things done	9	18
Makes me feel less suspicious	9	18
Helps me to manage my appetite	9	18
Relieves side effects of medication	6	12
Increases my motivation	6	12
Increases my energy	6	12
Helps me enjoy sexual experiences more	5	10
Helps me go along with others when pressured to	4	8
Helps me manage my voices	4	8
Helps me manage my visions	2	4

3.4.2 Q analysis - Reasons for use: Whole sample

Principal component analysis resulted in a two factor solution. Of the 50 participants who completed the sort, 48 loaded on one of these two factors, and 41% of the variance was explained. Twenty six participants loaded exclusively on factor 1 (accounting for 23% of the variance) and 22 participants loaded on factor 2 (18% variance). Two participants' sorts did not load on either one of the factors and these sorts do not contribute to the following factor interpretations. See the end of this section for further details about these individuals.

3.4.2.1 Interpretation of the factors

The factor arrays for this sort are presented in table 9 following the interpretation section on page 84.

Factor 1: Mood management

Individuals who loaded on this factor reported the use of alcohol or cannabis to help them to manage their mood. Statements endorsed imply that substance use for this group of individuals enables them to better cope with distressing feelings – one participant who loaded on this factor explains "*[drinking] used to be about socialising, but now it's more about making me calm – it helps me to cope with everything that comes along with being high*". Individuals loading on factor 1 reported the most common reason for substance use is that it makes them feel calm (+5), helps them to sleep (+4), helps them to relax (+4) and makes them feel less restless (+3). One individual loading on factor 1 explains "*it's the only thing that works to calm my anxiety – it really helps to manage it*". Another participant explained that cannabis is his form of "*mood management – it's a guarantee that I won't get locked up (psychiatric hospital)*" and goes on to explain that for him, "*sleep and going high go hand in hand*", explaining that if cannabis wasn't available to help him sleep when he's feeling manic, he feared he would become more unwell. Some of the statements endorsed by this group appear to be directly linked with the symptoms of mania or hypomania such as substance use directly to stop feeling too high (+1) as well as use to slow down racing thoughts (+3), reduce restlessness (+3) and to feel less irritable (+2). A further exemplar individual for this factor explained that his substance use is directly linked with feeling high: "*today I woke up feeling high and I couldn't have spoken to you unless I'd smoked to bring me back down to normal….sometime I like the high so I don't smoke, but if I want to stop it or slow it down, I normally can with weed.*"

Interestingly, this group of individuals also reported substance use to help them to manage low mood (+2) and anxiety (+1) and also reported use of alcohol or cannabis to feel good (+2). Furthermore, they reported substance use as an aid to reaching a new level (+2); to help them think (+1); to cope with painful memories (+1) and to deal with problems (+1), or as one participant explained "*I call it head in the sand syndrome*"

This group of participants did not endorse substance use to help them manage psychotic symptoms such as hearing voices (-5), or visions (-4). There is also little evidence of substances being used to reduce the side effects of medication (-3) or that use of cannabis or alcohol helped this group to feel less suspicious (-2). In keeping with the use of substances to reduce symptoms of mania, this group did not endorse using substances to increase energy (-4) or as an aid to help them get or stay high (-2). Moreover, individuals loading on this factor did not endorse socially related reasons such as substance use to go along with others (-2), to join in with family and friends (-2), make them more sociable (-1), reduce inhibitions (-1), help them fit into social situations (-1) or to reduce loneliness (-1). One participant who loaded on this factor explained "*it's the opposite of being more sociable, it's more about being less".* Another explained, "*it's not social for me, I lock myself away from people with my problems*."

Factor 2: Social reasons

For an individual loading on factor 2, feeling good was the most important reason for use (+5) "*It gives you pleasure*". In contrast to those who loaded on factor 1, people who loaded onto factor 2 tended to endorse far more socially motivated reasons for use than those seen earlier, for example use of alcohol or cannabis to be more sociable (+3) and alleviate boredom (+3). People loading on factor 2 reported substance use to boost confidence (+2), fit in (+1), reduce inhibitions (+1), join in with family or friends (+2) or feel less lonely (+2). One participant loading on this factor referred to drinking alcohol as "just *something you do when spending time with friends".* This group did report using alcohol or cannabis for the sedative effects endorsed by those loading on factor one, but these reasons appeared to be far less important for them, for example substance use to feel calm (-2), normal (-1), reduce irritability (-1) or improve sleep (-1) were less likely to be endorsed than social reasons. Other mania related symptoms such as to slow down racing thoughts (-1), or to stop feeling too high (-2) did not appear as reasons for use in this group.

Similarly to those who loaded on factor 1 however, individuals loading on factor 2 did not report that substance use helps them to manage psychotic symptoms such as voices (-5) or visions (-4), and did not report alcohol or cannabis use to manage the side effects of medication (-4) or make them less suspicious (-2).

However, there were also some mood related reasons endorsed by participants loading on this factor such as substance use to help manage low mood (+3) and reduce anxiety (+3) "*I recently detoxed and I'm finding it very hard to stay of (alcohol) as it helps me to manage/ control my mood*"; *"(Alcohol) helps me. I'm not addicted, but I'm home alone all day feeling depressed and when I drink I get relief"*; *"I only drink when I get depressed – I wouldn't bother if I felt ok"*. So it appears that even though this group reported substance use a predominantly social, they also acknowledge the role of alcohol and cannabis to cope with distressing feelings.

Participants who did not load on either factor

As noted, two participants did not load on either of the factors described. The first participant was male, met criteria for BD I and reported alcohol to be his MPS. He endorsed the use of alcohol to reduce his inhibitions (+5) and to make him feel good (+4). Unlike the other participants he endorsed using substances to help him enjoy sexual experiences more (+4); manage voices (+1) and visions (+1).

The second participant was a female and also met criteria for BD I. This participant reported using cannabis to feel normal (+5), to focus (+4) and to feel good (+4). She endorsed using cannabis to make her more creative (+3) and to stop her getting too high/ manic (+2). At the same time, she also reported using cannabis to get high/ manic (+2). For this participant, cannabis use increased energy (+2) and made her open to new ideas (+1).

Table 9: Factor arrays

Q sort statement	**Factor 1** *Mood management*	**Factor 2** *Social Reasons*
Makes me feel normal	0	1
Makes me feel less alone/ lonely	-1	2
Helps me to celebrate success	0	0
Relieves side effects of medication	-3	-4
Its helps me to think	1	-2
Satisfies my cravings/ dependency	1	0
Slows down my racing thoughts	3	-1
Helps me to sleep	4	1
Enables me to join in with what family and friends are doing	-2	2
Helps me get along with others when pressured to	-2	-1
Helps me to feel less irritable	2	1
Helps me manage low mood	2	3
Alleviates boredom	1	3
Helps me to achieve an altered state of mind	2	1
Helps me to relax	4	4
Reduces my anxiety	1	3
Helps me manage my visions	-4	-4
Helps me to manage my anger	0	-3
Helps me to get/stay high/elated	-2	0
Makes me less restless	3	0
Increases my creativity	0	-1
Increases my motivation	-3	-3
Helps me focus/ get things done	-1	-3
Helps me cope with difficult/ memories	1	0
Increases my energy	-4	-1
Helps me deal with problems	1	0
Makes me more open to new ideas	0	-1
Boosts my confidence/ self esteem	-1	2
Helps me to fit in	-1	1
Helps me manage my voices	-5	-5
Relieves physical pain	0	-2
Makes me feel good	2	5
Makes me feel less suspicious	-2	-2
Makes me less inhibited	-1	1
Helps me enjoy sexual experiences more	-2	-1
Helps me to switch off	3	2
Makes me more sociable	-1	4
Stops me from feeling too high/ elated	2	-2
Helps me to manage my appetite	-3	-2
Fits into my routine/ lifestyle	0	0
Makes me feel calm	5	2

3.4.3 Group differences between factors

Statistical tests were employed to explore whether there were any differences in the participants loading on factor 1 (mood management) and factor 2 (social reasons) in terms of demographic, clinical or substance use characteristics.

Demographic differences

Although not significant to the 0.05 level, there appeared to be a trend for the mood management subgroup (65%) to be living alone (χ^2 (1) = 2.88, p = 0.09), while those who loaded onto the social reasons factor more frequently were living with a partner/ child or other (59%). Borderline differences were also detected for participants who endorsed reasons related to mood management to be more frequently single and unmarried (92%) than those who were using substances for social reasons (68%; χ^2 (1) = 4.553, p = 0.06, FET).

Table 10: Demographic differences between participants loading on factors

Demographic variable	**Factor 1** *Mood management* N = 26	**Factor 2** *Social reasons* N = 22	**Test, *p***
Mean age	40.19	40.73	t (46) = -0.15
SD	13.00	11.45	p = 0.88
	N (%)	N (%)	
Gender			
Male	16 (62)	11 (50)	χ^2 (1) = 0.65
Female	10 (38)	11 (50)	p = 0.42
Marital status			
Married/ co habiting	2 (8)	7 (23)	χ^2 (1) = 4.55
Not married	24 (92)	15 (68)	P = 0.06 (FET)
Living arrangement			
Co habiting	9 (35)	13 (59)	χ^2 (1) = 2.88
Living alone	17 (65)	9 (41)	P = 0.09
Education			
GCSE or below	8 (31)	12 (54.5)	χ^2 (1) = 2.77
Beyond GCSE	18 (69)	10 (45.5)	P = 0.10
Parental status			
Parent	14 (54)	9 (41)	χ^2 (1) = 0.80
No children	12 (46)	13 (59)	P = 0.37
Currently working			
Yes	5 (19)	4 (18)	χ^2 (1) = 0.01
No	21 (81)	18 (82)	p = 1.00 (FET)

FET, Fishers exact test

Clinical differences

There was just one borderline difference between the two groups according to clinical data, though significance levels were not met. These differences were related to number of manic episodes experienced by participants. Inspection of adjusted residuals in the cells indicated that those who sorted reasons related with mood management showed a trend for having experienced a greater number of manic episodes (46% reporting more than 20 manic episodes) while the social reasons group reported a fewer number of manic episodes (55% reporting fewer than 7) (χ^2 (2) = 6.18, p = 0.06, FET).

Table 11: Clinical differences between participants loading on factors

	Factor 1 Mood management N = 26	**Factor 2** Social reasons N = 22	**Test,** ***p***
	N (%)	N (%)	
No. depressive episodes:			
(<7)	5 (23)	10 (53)	χ^2 (2) = 3.95
(8 – 19)	7 (32)	4 (21)	p = 0.14
(>20)	10 (45.5)	5 (26)	
No. manic episodes:			
(<7)	**-** 5 (23)	**+** 12 (60)	χ^2 (2) = 6.18
(8 – 19)	5 (23)	3 (15)	p = 0.06 (FET)
(>20)	**+** 12 (54.5)	**-** 5 (25)	
Mean HRSD score *(trans: Sq rt)*	2.78	2.18	t (46) = 1.51 p = 0.14
Mean MAS score *(trans: Log)*	0.14	0.36	t (46) = 0.48 p = 0.64
Mean ISS Activation score	168.85	142.27	t (46) = 1.01 p = 0.32
Mean PHQ score	10.19	8.50	t (46) = 0.84 p = 0.41

FET, Fishers exact test; trans Sq rt, variable transformed using square root; *trans:* Log, variable transformed using log transformation; **+**, adjusted residuals in cells indicate over representation; **-**, adjusted residuals in cells indicated under representation

Substance use differences

In terms of substance use details, factor 1 (mood management) was exemplified by more cannabis users (58%), compared with 23% on factor 2 (χ^2 (1) = 5.99, p = 0.01).

Table 12: Substance use differences between participants loading on factors

	Factor 1 Mood management N = 26	**Factor 2** Social reasons N = 22	**Test, *p***
	N (%)	N (%)	
Problematic Substance:			
Alcohol	11 (42)	17 (77)	χ^2 (1) = 5.99
Cannabis	15 (58)	5 (23)	p = 0.01
SCID alcohol diagnosis:			
Current dependence	6 (23)	7 (32)	χ^2 (2) = 0.67
Current abuse	4 (15)	4 (18)	p = 0.73 (FET)
No alcohol disorder	16 (62)	11 (50)	
SCID cannabis diagnosis:			
Current dependence	9 (35)	6 (27)	χ^2 (2) = 3.42
Current abuse	3 (11)	0	p = 0.26 (FET)
No cannabis disorder	14 (54)	16 (73)	
No. days used MPS in past month (mean rank)	24.37	24.66	U = 282.50 p = 0.94
Mean period of use (years) of MPS at this level *(trans: Sq Rt)*	2.69	2.67	t (46) = 0.05 p = 0.97

FET, Fishers exact test; trans Sq rt, variable transformed using square root.

3.4.4 Main reasons for substance use: Most problematic substance

As analyses showed a difference in reported reasons for use according to MPS, and in order to explore whether the most frequently endorsed reasons for substance use varied between those using alcohol (alc) and those using cannabis (can), the sample was broken into two subgroups. The following comparisons refer to the percentages of participants in each sub group to endorse each reason and are not made on the basis on statistical tests.

Table 13 shows that 'helps me to relax' remained the most common reason for both groups, however for the alcohol group, the second most common reason related to anxiety reduction, while for the cannabis users, 'makes me feel good' was the next most commonly endorsed reason. A high proportion of both groups endorsed the sedative benefits of substance use such as to slow down racing thoughts (alc 16, 55%; can 11, 52%) and to aid sleep (alc 15, 52%; can 16, 76%). Similar numbers in each group also reported using alcohol or cannabis to manage low mood (alc 22, 76%; can 15, 71%) and alleviate boredom (alc 23, 79%; can 13, 62%).

Interestingly, alcohol users appear to have endorsed drinking to feel less lonely to a greater extent than the cannabis subgroup. Similarly, more than twice the number in the alcohol group endorsed drinking to boost confidence; to reduce inhibitions or to be more sociable than the cannabis group.

Although low numbers of participants in both groups endorsed substance use to relieve the side effects of medication, more than double the number of the cannabis group endorsed this statement (5; 24%) compared with the alcohol group (2; 7%). There was also more than twice the number of cannabis users reporting substance use to help them to think (can 11, 52%; alc 5, 17%), three times the number reporting use to manage anger (can 9, 43%; alc 3, 10%) and double the proportion reporting use to stop them feeling too high/ elated (can 9, 43%; alc 6, 21%).

Table 13: Reasons for substance use most frequently endorsed by alcohol group (*n* = 29) and cannabis group (*n* = 21)

Reasons for substance use (Q sort statement) most commonly endorsed by the Alcohol group	**Statement endorsed**		**Reasons for substance use (Q sort statement) most commonly endorsed by the Cannabis group**	**Statement endorsed**	
	N	%		*N*	%
Helps me to relax	25	86	Helps me to relax	20	95
Helps me to switch off	24	83	Makes me feel good	19	90
Reduces my anxiety	24	83	Helps me to switch off	18	86
Alleviates boredom	23	79	Makes me feel calm	18	86
Makes me feel calm	23	79	Helps me to sleep	16	76
Helps me manage low mood	22	76	Helps me feel less irritable	16	76
Makes me feel good	21	72	Makes me less restless	16	76
Boosts my confidence	21	72	Helps me manage low mood	15	71
Helps me to achieve an altered state of mind	20	69	Reduces my anxiety	14	67
Makes me more sociable	19	66	Alleviates boredom	13	62
Helps me cope with difficult/painful memories	18	62	Helps me to achieve an altered state of mind	12	57
Makes me feel less alone/ lonely	18	62	Helps me deal with problems	11	52
Satisfies my cravings/ dependency	16	55	Slows down my racing thoughts	11	52
Slows down my racing thoughts	16	55	Its helps me to think	11	52
Reduces my inhibitions	15	52	Helps me to celebrate success	9	43
Helps me feel less irritable	15	52	Makes me feel normal	9	43
Makes me less restless	15	52	Helps me manage my anger	9	43
Helps me to sleep	15	52	Increases my creativity	9	43
Makes me feel normal	13	45	Stops me feeling too high/ elated	9	43
Enables me to join in with what family and friends are doing	11	38	Fits into my routine/ lifestyle	9	43
Helps me get/stay high/elated	11	38	Makes me more sociable	8	38
Helps me deal with problems	10	34	Makes me more open to new ideas	8	38
Relieves physical pain	9	31	Helps me cope with difficult/painful memories	8	38
Increases my creativity	9	31	Satisfies my cravings/ dependency	8	38
Fits into my routine/ lifestyle	8	28	Makes me feel less alone/ lonely	7	33
Helps me to celebrate success	8	28	Helps me get/stay high/elated	7	33
Helps me to fit in	8	28	Relieves physical pain	7	3
Makes me more open to new ideas	7	24	Boosts my confidence	6	29
Makes me feel less suspicious	7	24	Helps me focus/ get things done	6	29

Stops me feeling too high/ elated	6	21	Relieves side effects of medication	5	24
Its helps me to think	5	17	Helps me to manage my appetite	5	24
Increases my energy	5	17	Enables me to join in with what family and friends are doing	4	19
Helps me to manage my appetite	4	14	Helps me to fit in	4	19
Increases my motivation	4	14	Reduces my inhibitions	3	14
Helps me to go along with others when pressured to	3	10	Helps me enjoy sexual experiences more	2	10
Helps me manage my anger	3	10	Increases my energy	2	10
Helps me focus/ get things done	3	10	Makes me feel less suspicious	2	10
Helps me manage my voices	3	10	Increases my motivation	2	10
Helps me enjoy sexual experiences more	3	10	Helps me to go along with others when pressured to	1	5
Relieves side effects of medication	2	7	Helps me manage my visions	1	5
Helps me manage my visions	1	3	Helps me manage my voices	1	5

3.4.4.1 Q analysis - Reasons for Use: Alcohol subgroup

As differences between alcohol and cannabis users were identified, the Q analysis was repeated for each group separately. These analyses should be considered exploratory due to the small sample size, though, "*Within Q methodology, the breadth and diversity of the participant sample are considered more important than proportionality*." (Brown, 1996.)

Q analysis of the alcohol users sorts (*n*=29) revealed a two factor solution accounting for 45% of the variance. All 29 participants loaded onto one of these two factors; 20 on factor 1 (accounting for 29% of the variance) and 9 on factor 2 (accounting for 16% variance). These two factors were very similar to those identified in the unified sample.

Interpretation of the factors

The factor arrays for this sort are presented in table 15.1, appendix 15.

Factor 1: Mood management

People who loaded on factor 1 reported using alcohol to feel good (+5), calm (+4), relax (+4), switch off (+3) and to feel less restless (+1). This group also reported alcohol use to manage low mood (+3) and reduce anxiety (+3).

Some subtle differences from factor 1 in the unified sample (alcohol and cannabis users combined) include the apparent importance placed on the use of alcohol primarily to feel good (+5) and feel normal (+2). There also appears to be more emphasis on social reasons for use in this factor, for example use to be more sociable (+2), to alleviate boredom (+2) to have more confidence (+2), feel less lonely (+1) and reduce inhibitions (+1). These are potentially all reasons more likely associated with alcohol use due to its disinhibiting effects. Interestingly, this group also endorsed alcohol use to help them get high/ manic (+1), highlighting the possibility that they use for different reasons at different points in time "*it depends on my mood, my reasons are different if I'm really high or really low*".

Factor 2: Social Coping

Similarly to the 'social' group in the unified sample, participants loading on this factor appeared to endorse social motivations (helps me relax +4, alleviates boredom +3, helps me fit in +2) to a greater extent than participants on factor 1. In contrast to the social factor in the whole group, however, a reason which has not been previously important: alcohol use to cope with painful memories (+5) is the statement this group indicated applied to them the most, suggesting that for this subgroup, alcohol may play some role in coping with past events. To satisfy cravings and dependency (+4) was also endorsed by these participants. Alcohol users who loaded on factor 2 reported using alcohol for more general coping reasons e.g. slows down racing thoughts (+2);

helps manage low mood (+1) but they appeared less important reasons for use than for participants loading on factor 1.

With the exception of some small differences in the positioning of statements, those reasons not endorsed by those loading on factor two are similar to factor 2 in the whole group analysis, such as substance use to help manage psychotic symptoms such as voices (-1) or visions (-2). Participants on this factor also do not report alcohol or cannabis use to manage the side effects of medication (-2) or make them less suspicious (0).

3.4.4.2 Group differences between factors

The same analyses that were conducted for the unified sample were repeated for the separate subgroups to explore whether there were any differences in the groups loading on factor 1 (mood management) and factor 2 (social coping) in terms of demographic, psychiatric or substance use characteristics. Full tables presenting these results are presented in table 16.1, appendix 16.

A significant difference between participants loading on the two factors was evident regarding level of education attained. A greater number of participants loading on factor 1 (mood management) had received education beyond GCSE level (65%) compared with those loading on the social coping factor (22%; χ^2 (1) = 4.55, p = 0.05, FET).

Furthermore, *t* tests revealed that alcohol users who loaded onto the mood management factor tended to score more highly on the Mania Rating Scale (MAS), an observer rated measure of mania (U = 52.00, p = 0.06), though this difference was not significant.

3.4.4.3 Q analysis - Reasons for use: Cannabis subgroup

Q analysis of the cannabis subgroups sorts (n=21) revealed a three factor solution explaining 58% of the variance. Twelve individuals loaded exclusively on factor 1 (explaining 30% of the variance); four on factor 2, one inversed[3] (explaining 13% of the variance) and four individuals loaded on a new, third factor (explaining 15% of the variance). One individual who sorted statements according to their cannabis use did not load exclusively on any one factor, but loaded across all three and so their sort does not contribute to the following factor interpretations.

Interpretation of the factors

The factor arrays for this sort are presented in table 15.2, appendix 15.

Factor 1: Managing high mood

This subgroup of cannabis users appear to report substance use specifically associated with the reduction of symptoms of high mood. This group reported using cannabis to help them sleep (+5), feel calmer (+4), relax (+4), switch off (+3), slow down thoughts (+3), reduce restlessness (+3), reduce irritability (+2) and stop them feeling too high (+2). The majority of reasons reported by the cannabis group related to mood regulation and suggest that cannabis is used primarily with the intention to alleviate symptoms of high mood. Although participants loading on this factor also endorsed cannabis use to satisfy cravings and dependency (+1), this group of participants did not endorse social reasons for cannabis use. Many socially motivated reasons for use were placed on the left hand side of the grid by the cannabis subgroup, such as to feel less lonely (-1), more confident (-1), more sociable (-1) and joining in with what family and friends are doing (-1), suggesting that for this group of participants, cannabis use is not socially motivated at all.

Factor 2: Social reasons

In contrast to factor 1, cannabis users loading on factor 2 did endorse socially driven reasons for substance use such as to be more sociable (+5), to fit in (+4), to be more confident (+4), to join in with family and friends (+3) and to reduce inhibitions (+2).

An exemplary sort for this factor appears to share many features with the social factor defined in the whole sample and in the alcohol subgroup. Some minor differences lay in the suggestion that cannabis for this group is used to get/stay high/elated (+2) and feel less suspicious (+2) – both reasons which were not positively endorsed in previous analyses. Participants loading on factor 2 also endorsed symptom related reasons for cannabis use less than those loading on other factors. For example, the exemplary sort for factor 2 is the only sort in this section of analyses which did not positively endorse substance use for dealing with problems (-1) and to become

[3] An inversed loading on any factor means that a participant sorted the statements onto the response grid in an opposite way to the other participants who loaded positively onto that factor.

less restless (-2). Furthermore, statements such as substance use to manage low mood (+1) appear less important than social motivations than for participants loading on other factors.
Finally, interestingly, the three participants loading on factor 2 in the current analysis did not endorse cannabis use to make them more creative (-3) or to make them more open to new ideas (-1).

A fourth participant loaded negatively onto this factor (see footnote). This participant was male and met criteria for BD I. This participant sorted his reasons for cannabis use in the opposite order than other participants who loaded onto factor 2.

Factor 3 – Cognitive enhancement

A final, new factor emerged when analysing the sorts of participants reporting reasons for cannabis use. There were some similarities to other factors in the motivations reported by this group such as 'makes me feel good' (+5), 'makes me less irritable' (+4) and 'makes me feel calm' (+2) however this third factor appears to represent those cannabis users who reported cannabis use to some extent for cognitive enhancement. Cannabis users who loaded on this factor reported that they use cannabis to help them to think (+2), to focus (+2), to increase their creativity (+2) and to help them deal with problems (+2), all reasons which were not endorsed by those loading on factors 1 or 2. Participants loading on this new factor did not endorse using cannabis to sleep and appeared to place less emphasis on other statements directly associated with reducing mania symptoms, such as 'makes me less high/manic' (0), 'helps me switch off' (+1) and 'makes me less restless' (+1). Also, similarly to those loading on factor 1, this third group of cannabis users did not endorse social motivations such as 'boosts my confidence'(-2), 'helps me fit in' (-3) or 'makes me more sociable' (-1).

3.4.4.4 Group differences between factors

Once again, the same analyses that were conducted for the unified sample and alcohol subgroup were repeated for the cannabis subgroup to explore any differences in this group according to factor membership in terms of demographic, psychiatric or substance use variables. No significant differences were found.

Full tables of results are presented in appendix 16 (table 16.2).

3.5 After-effects of substance use

3.5.1 Main after-effects of substance use

Frequency counts and percentages for the number of times each after-effect of substance use was placed on the right hand side of the Q sort grid – suggesting positive endorsement of this statement are provided in table 14. The most commonly endorsed after-effect for this sample was feeling tired (36; 72%), which was positively endorsed by almost three quarters of the group. Interestingly, feeling 'better' was endorsed by only one fewer participant (35; 70%); it appears that a mixture of positive and negative statements are relevant and applicable to many participants completing this sort.

Thirty one participants reported that they were more confident (31; 62%) in the time following substance use and just over half of the group reported feeling more sociable (27; 54%) and more likeable (26; 52%) as an after-effect of substance use.

Two thirds of the sample reported their thoughts slowing down as an after-effect of substance use (32; 64%), and relatively high numbers (28; 56%) felt less irritable afterwards. One third (18; 36%) reported feeling depressed after using substances and similar numbers endorsed feeling paranoid and worthless.

Seven participants (14%) endorsed feeling suicidal after using substances, and one in ten participants reported having hallucinations following substance use (5; 10%).

The statements most frequently identified as the most likely after-effects of substance use (as placed on the far right hand side of the response grid) were feeling better (identified as the most common after-effect by 7 participants; 14%), followed by feeling less irritable (5; 10%); feeling ill (4; 8%) and preventing a high/ manic mood (4; 8%).

Table 14: After-effects most frequently endorsed by the whole sample (*n* = 50)

After-effect of substance use (Q sort statement)	**Number endorsing each statement** *(+1, +2, +3, +4, +5)*	
	N	%
I feel tired	36	72
I feel better	35	70
I have memory loss	33	66
I feel my thoughts slow down	32	64
I feel more confident	31	62
I feel guilty	29	58
I feel less irritable	28	56
I feel a buzz	28	56
I feel more sensitive to highs and lows	28	56
I feel more sociable	27	54
I feel more likeable	26	52
I don't feel like talking to people	25	50
I feel impulsive/ disinhibited	25	50
I feel I can function better	24	48
I feel confused	23	46
I feel less angry	22	44
I have disturbed sleep	22	44
I feel isolated	21	42
Stops me going high/ elated	20	40
I feel I can do things I normally can't	20	40
I feel more motivated	20	40
I feel ill	20	40
I feel fearful/scared	20	40
I can concentrate better	19	38
I don't feel the benefit from my medication	19	38
I feel anxious	19	38
I have a longer attention span	19	38
I feel worthless	18	36
I feel paranoid	18	36
I feel depressed	18	36
I feel more bothered by past events	18	36
I feel out of control	18	36
I get high/ elated	18	36
I have racing thoughts	17	34
I have flashbacks	13	26
I black out	12	24
I feel sexually aroused	9	18
I have a better memory	8	16
I feel suicidal	7	14
I have hallucinations	5	10

3.5.2 Q analysis - After-effects: Whole sample

Principal component analysis of sorts relating to the after-effects of substance use resulted in a three factor solution. Of the 50 participants who completed the sort, 48 loaded on one of these three factors, and 49% of the variance was explained. Twenty five participants loaded exclusively on factor 1 (one of these was inversed), accounting for 23% of the variance. Sixteen participants loaded on factor 2 (accounting for 16% of the variance) and seven participants loaded onto a third factor (accounting for 10% of the variance). Two participants' sorts did not load exclusively onto either one of the defined factors. One of these participants loaded onto both factors 2 and 3 and the second participant loaded equally onto all three factors. These sorts do not contribute to interpretations below.

3.5.2.1 Interpretation of the factors

The factor arrays for this sort are presented in appendix 15, table 15.3.

Factor 1: Positive after-effects

Individuals loading on factor 1 reported feeling better as an after-effect of substance use (+5) "*I feel more capable, more confident*". They felt more confident (+3), sociable (+3) and more likeable (+2) in the time period following use of alcohol or cannabis. "*(Cannabis) makes everything easier; I don't really feel the negative effects that other people talk about*". This group also tended to report feeling less irritable (+4) and angry (+2) in the time following use of substances. "*I just feel content, less bothered by people's opinions, less affected by everything*". They felt their thoughts slow down (+3) and reported that they could function better (+4) "*It means I can function effectively, without it I'm out of control*". This group endorsed being able to concentrate better (+2) and reported feeling more motivated (+1) after substance use. One participant described improved functioning in specific circumstances "*I function generally better as a musician, but not as a driver*". This was endorsed by another participant, who reported that substance use enables him to "*concentrate better on music, but not on other things*". Participants who loaded on factor 1 also reported feeling a buzz (+2) from substance use, and being more impulsive (+1) as a result of using alcohol or cannabis. They reported that they can do things they normally can't (+1), suggesting that this group of individuals experienced both mood related improvements, and changes in their psychological state following substance use. However, although those loading on factor 1 endorsed after-effects related to high mood, at the same time, they also reported how substance use stops them feeling too high (+1) and allows them a longer attention span (+1). After-effects endorsed by individuals loading on this factor appear mainly to be positive, though individuals do report feeling tired (+2) and having disturbed sleep (+1) though importantly, one individual loading on factor 1 described feeling tired as a positive after-effect.

This group of participants did not report hallucinations (-5) as an after-effect of substance use, nor did they experience flashbacks (-4), feel suicidal (-4), feel paranoid (-3), black out (-3) or feel more bothered about their past (-2). Individuals loading on this factor did not endorse many of the negative after-effects of substance use presented in the Q sort. For example, they did not report feeling anxious (-2), ill (-2), depressed (-2), scared (-1), or having racing thoughts (-3) and in-keeping with an earlier observation that they experience memory loss, they did not positively endorse having a better memory (-1) following substance use.

One individual's sort was directly inversed on factor 1, meaning they loaded on the opposite arrangement to those described above. This participant was male, married with children, met criteria for BD I and reported his MPS to be alcohol. "*All after-effects are negative. I think I'm going to get certain things from it but I never do – I never learn. All reasons are short term – but the long term effects are worse than the short term gains – it's just not worth it.*"

Factor 2: Negative after-effects

In contrast to factor 1, individuals who loaded on factor 2 reported far more negative consequences of substance use. For example, they endorsed feeling ill (+5), anxious (+4), guilty (+4), depressed (+3), scared (+2) and worthless (+2) as the most common after-effects of use. One participant reported that the consequences of use seem to be "*all of the opposites to the reasons why I drink*".

This group of individuals reported feeling more sensitive to highs and lows (+1), and experience racing thoughts (+3) following use. Similarly to those loading onto factor 1, those loading on factor 2 reported feeling tired (+3) following substance use, as well as experiencing memory loss (+1) and having disturbed sleep (+1) "*alcohol generally exacerbates low mood, if I'm low, its makes me even lower*". However, in contrast to those individuals loading on factor 1, those on factor 2 also reported feeling out of control (+1) after substance use as well as feeling confused (+1), isolated (+2) ,paranoid (+1) and more bothered by past events (+2). This group did not endorse positive social after-effects of alcohol or cannabis use: they do not feeling like talking to people (+1), and place feeling more likeable (-2), more sociable (-2) and more confident (-2) on the negative side of the response grid.

In contrast to those loading on factor 1, this group did not report being able to concentrate (-3) or function better (-1). They did not report feeling more motivated (-2) and they did not report feeling 'better' (-1) as after-effects of alcohol or cannabis use. Those loading on factor 2 also did not endorse the intoxicating effects of alcohol or cannabis use such as feeling a buzz (-1) or getting high (0).

However there are some similarities between those loading on factor 1 and factor 2. Neither groups endorsed having a better memory (-4), feeling sexually aroused (-4), having hallucinations (-5) or feeling suicidal (-3) as an after-effect of substance use.

Factor 3: Getting 'high'

Like factor 1, the majority of after-effects endorsed by people loading on factor 3 were positive. For example, main after-effects of substance use for this group included feeling more confident (+5), sociable (+4) and likeable (+3). One participant loading on factor 3 explained "*I just feel more chilled out*". This group also felt better (+2) following substance use, as well as reporting thoughts slowing down (+2).

However, a number of after-effects distinguish this third factor from factor 1. The participants loading on factor 3 endorsed feeling a buzz (+4) and getting high/ elated (+3) following substance use. They also reported feeling impulsive and dis-inhibited (+3). Moreover, unlike those loading on factor 1, this group of individuals also endorsed some negative after-effects of use such as feeling paranoid (+2), having racing thoughts (+2), feeling ill (+1) and blacking out (+1). Like those who loaded on factor 2, those loading on factor 3 endorsed feeling out of control (+1) and confused (+1), reporting a mixture of positive and negative consequences of substance use.

In line with both factors 1 and 2, those loading on factor 3 did not feel suicidal (-5) or report a better memory (-4) after substance use, however distinguishing this group from both other factors, those on factor 3 did not endorse substance use to stop them going high (-4) nor to make them more sensitive to highs and lows (-3). In all, it appears those participants who load on factor 3 tend to experience social and enhancement (intoxicating) effects, while also acknowledging the negative consequences.

3.5.3 Group differences between factors

Once again statistical tests were used to explore whether there were any differences in the groups loading on factors 1, 2 and 3 in terms of categorical demographic, clinical or substance use characteristics.

Demographic differences

There were no significant differences found between the participants loading on any of the three after-effects factors in terms of demographic information.

Table 15: Demographic differences between participants loading on factors

Demographic variable	**Factor 1** Positive *N* = 24	**Factor 2** Negative *N* = 16	**Factor 3** 'High' *N* = 7	**Test, *P***
Mean age	40.25	38.06	40.86	$F(2, 44) = 0.19$
SD	12.57	12.62	10.61	$p = 0.82$
	N (%)	*N* (%)	*N* (%)	
Gender				
Male	14 (58)	7 (44)	6 (86)	χ^2 (2) = 3.52
Female	10 (42)	9 (56)	1 (14)	$p = 0.18$ (FET)
Marital status				
Married/ co habiting	4 (17)	2 (13)	2 (29)	χ^2 (2) = 0.90
Not married	20 (83)	14 (87)	5 (71)	$p = 0.75$ (FET)
Living arrangement				
Co habiting	10 (42)	8 (50)	3 (43)	χ^2 (2) = 0.28
Living alone	14 (58)	8 (50)	4 (57)	$p = 0.92$ (FET)
Education				
GCSE or below	7 (29)	7 (44)	3 (43)	χ^2 (2) = 1.04
Further education	17 (71)	9 (56)	4 (57)	$p = 0.64$ (FET)
Parental status				
Parent	10 (42)	11 (69)	4 (57)	χ^2 (2) = 2.88
No children	14 (58)	5 (21)	3 (43)	$p = 0.23$ (FET)
Currently working				
Yes	5 (21)	3 (19)	2 (29)	χ^2 (2) = 0.29
No	19 (79)	13 (81)	5 (71)	$p = 0.79$ (FET)

FET, Fishers exact test

Clinical differences

No significant differences were found between the participants loading on any of the three after-effects factors in terms of clinical information.

Table 16: Clinical differences between participants loading on factors

	Factor 1 Positive *N* = 24	**Factor 2** Negative *N* = 16	**Factor 3** 'High' *N* = 7	**Test,** ***P***
	N (%)	*N* (%)	*N* (%)	
No. depressive episodes:				
(<7)	7 (35)	4 (29)	5 (71)	χ^2 (4) = 6.08
(8 – 19)	4 (20)	6 (43)	1 (14)	*p* = 0.26 (FET)
(>20)	9 (45)	4 (29)	1 (14)	
No. manic episodes:				
(<7)	9 (43)	4 (31)	4 (57)	χ^2 (4)= 4.492
(8 – 19)	2 (9.5)	4 (31)	2 (29)	*p* = 0.31 (FET)
(>20)	10 (48)	5 (38.5)	1 (14)	
Mean HRSD Score *(trans: Sq rt)*	2.26	2.85	2.49	*F*(2, 44) = 0.83 *p* = 0.44
Mean MAS Score *(trans: Log)*	0.43	0.36	0.47	*F*(2, 44) = 0.31 *p* = 0.73
Mean ISS Activation Score	151.25	171.25	144.29	*F*(2, 44) = 0.29 *p* = 0.75
Mean PHQ score	7.54	11.50	12.14	*F*(2, 44) = 2.25 *p* = 0.12

FET, Fishers exact test; trans Sq rt, variable transformed using square root; trans Log; variable transformed using log transformation.

Substance use differences

Differences were detected regarding SCID alcohol disorder diagnosis. Adjusted residuals in the cells revealed that a significantly greater number of participants (71%) loading on factor 1 (positive after-effects) did not meet criteria for alcohol disorder (χ^2 (4) = 10.588, p = 0.03, FET) compared with those loading onto factor 2 (negative after-effects, 50%) and 3 (Getting 'high', 29%).

Borderline differences were also evident for participants' MPS. Although not significant to the 0.05 level, inspection of adjusted residuals in the cells suggest that the positive after-effects factor was more commonly exemplified by cannabis users (42%) than the negative after-effects factor (25%) or getting high factor (29%). Furthermore, fewer than expected who loaded on positive after-effects were using alcohol (42%, compared with 75% on factor 2 and 71% on factor 3) (χ^2 (2) = 5.02, p = 0.09, FET).

Table 17: Substance use differences between participants loading on factors

	Factor 1 Positive *N* = 24	**Factor 2** Negative *N* = 16	**Factor 3** 'High' *N* = 7	**Test, *P***
	N (%)	*N* (%)	*N* (%)	
Problematic Substance:				
Alcohol	**-** 10 (42)	12 (75)	5 (71)	χ^2 (2) = 5.02
Cannabis	**+** 14 (58)	4 (25)	2 (29)	p = 0.09 (FET)
SCID alcohol diagnosis:				
Current dependence	6 (25)	4 (25)	1 (14)	χ^2 (4) = 10.59
Current abuse	**-** 1 (4)	4 (25)	4 (57)	p = 0.03 (FET)
No alcohol disorder	**+** 17 (71)	8 (50)	2 (29)	
SCID cannabis diagnosis:				
Current dependence	7 (29)	4 (25)	3 (43)	χ^2 (4) = 1.23
Current abuse	2 (8)	1 (6)	0 (0)	p = 0.95 (FET)
No cannabis disorder	15 (63)	11 (69)	4 (57)	
No. days used MPS in past month *(Mean rank)*	25.0	24.38	19.71	H (2) = 0.97 p = 0.62
Mean period (years) used MPS at this level (trans: Sq Rt)	2.82	2.09	2.60	F (2, 44) = 1.24 p = 0.30

FET, Fishers exact test; trans Sq rt, variable transformed using square root; **+**, adjusted residuals in cells indicate over representation; **-**, adjusted residuals in cells indicated under representation.

3.5.4 Main after-effects of substance use: Most problematic substance

As with the reasons for use sort, the after-effects sorts were split according to participants' MPS (alcohol or cannabis). The following comparisons refer to the percentages of participants in each sub group to endorse each after-effect and are not made on the basis on statistical tests. The after-effects endorsed by the alcohol users were less positive than those endorsed by the cannabis group and both groups combined. The most frequently endorsed after-effect for alcohol users was tiredness (22; 76%). A large number endorsed feeling guilty (21; 72%) and isolated (17; 59%) after drinking, both of which were far less commonly endorsed by the cannabis group (8; 38% and 6; 29% respectively).

In contrast the most commonly endorsed after-effects reported by the cannabis subgroup appear to be positively related to symptoms; over three quarters of the group endorsed feeling less irritable and 15 participants (70%) explicitly reported that they are less likely to go high and their thoughts slow down after using cannabis. Far smaller proportions of this group endorsed the more negative after-effects such as feeling paranoid (8; 38%), guilty (8; 38%) or ill (7; 33%).

Table 18 presents frequency counts for after-effects endorsed by both the alcohol and cannabis subgroups.

Table 18: After-effects of substance use most frequently endorsed by the alcohol group (*n* = 29) and cannabis group (*n* = 21)

After-effect of substance use (Q sort statement) most commonly endorsed by the Alcohol group	**Statement endorsed** *N*	%	**After-effect of substance use (Q sort statement) most commonly endorsed by the Cannabis group**	**Statement endorsed** *N*	%
I feel tired	22	76	I have memory loss	16	76
I feel guilty	21	72	I feel less irritable	16	76
I have memory loss	18	62	Stops me going high/ elated	15	71
I feel better	17	59	I feel my thoughts slow down	15	71
I feel more confident	17	59	I feel tired	14	67
I feel impulsive/ disinhibited	17	59	I feel more confident	14	67
I feel isolated	17	59	I feel a buzz	14	67
I have disturbed sleep	17	59	I can concentrate better	13	62
I feel more sensitive to highs and lows	17	59	I feel better	13	62
I feel more sociable	16	55	I feel impulsive/ disinhibited	13	62
I don't feel like talking to people	16	55	I feel less angry	13	62
I feel my thoughts slow down	16	55	I feel more sensitive to highs and lows	12	57
I feel fearful/scared	15	52	I feel more likeable	12	57
I feel worthless	14	48	I have a longer attention span	12	57
I don't feel the benefit from my medication	14	48	I feel I can function better	11	52
I feel depressed	14	48	I feel more sociable	11	52
I feel more likeable	14	48	I feel more motivated	10	48
I feel anxious	13	45	I feel confused	10	48
I feel a buzz	13	45	I get high/ elated	10	48
I feel more bothered by past events	13	45	I feel I can do things I normally can't	9	43
I feel less irritable	12	41	I don't feel like talking to people	9	43
I have racing thoughts	12	41	I feel paranoid	8	38
I feel ill	12	41	I feel guilty	8	38
I feel out of control	12	41	I feel ill	7	33
I feel confused	12	41	I have disturbed sleep	6	29
I feel I can function better	12	41	I have a better memory	6	29
I feel I can do things I normally can't	11	38	I feel isolated	6	29

I black out	11	38	I have racing thoughts	6	29
I feel more motivated	10	34	I feel more bothered by past events	6	29
I have flashbacks	10	34	I feel out of control	6	29
I feel less angry	9	31	I feel sexually aroused	5	24
I feel paranoid	9	31	I feel worthless	5	24
I get high/ elated	8	28	I don't feel the benefit from my medication	5	24
I have a longer attention span	7	24	I feel fearful/scared	5	24
I can concentrate better	6	21	I feel anxious	5	24
I feel suicidal	5	17	I feel depressed	4	19
Stops me going high/ elated	5	17	I have flashbacks	3	14
I feel sexually aroused	4	14	I black out	2	10
I have hallucinations	3	10	I feel suicidal	2	10
I have a better memory	2	7	I have hallucinations	1	5

3.5.4.1 Q analysis - After-effects: Alcohol subgroup

As reported for the whole sample, principal component analysis of the alcohol sample (*n*=29) for the after-effects sort resulted in a three factor solution. Of the 29 alcohol users who completed the sort, 26 loaded on one of these three factors, and 50% of the variance was explained. Six participants loaded exclusively on factor 1 (accounting for 13% variance), 12 participants loaded on factor 2 (accounting for 20% variance) (two of these were inversed) and eight participants loaded onto the third factor (accounting for 17% variance).

One participant's sort did not load exclusively onto any of the defined factors. Furthermore, two sorts loaded onto two factors simultaneously; one on factors 2 and 3 and a second on factors 1 and 3. These sorts do not contribute to interpretations below.

Interpretation of the factors

The factor arrays for this sort are presented in, appendix 15, table 15.4.

Factor 1: Positive after-effects

Alcohol users who loaded on factor 1 placed feeling that they can do things they normally can't as a very common after-effect of alcohol use (+5) compared with the whole sample, who reported this after-effect as less relevant (+1). However, for the alcohol group, factor 1 shares many similarities with factor 1 described in analysis of the whole sample. After-effects are primarily positive; sorters feel they can function better (+4), more confident (+4), more motivated (+3), their thoughts slow down (+3), they feel less irritable (+2), more sociable (+1) and generally better (+3). There are also many similarities with the after-effects not endorsed, such as having hallucinations (-5), blacking out (-4), feeling paranoid (-4) and having racing thoughts (-3).

A discrete difference between an exemplary sort for this group compared with factor 1 for the whole sample is that this group did not appear to report feeling less angry (-1) in the 24 hours following drinking, or that it stops them from feeling high (-2).

Factor 2: Negative after-effects

Similarly, there are many commonalities between factor 2 for the alcohol subgroup and factor 2 (negative after-effects) in the whole sample. This factor describes the predominantly negative after-effects of alcohol use such as feeling anxious (+5), fearful (+4), ill (+4), more bothered by past events (+3) and depressed (+3).

Factor 3: Getting High

Finally, factor 3 in the alcohol subgroup has many similarities with factor 3 in the whole sample. Participants loading on this factor reported feeling a buzz (+2) and get high/ elated as a result of using alcohol (+1). Again, a large number of positive after-effects were endorsed – 'I feel better'

(+5), more confident (+4) and sociable (+4), however, some negative after-effects are also acknowledged, such as feeling out of control (+1) and confused (+1).

Differences between factor 3 for the alcohol subgroup and that of the whole sample include participants in the alcohol subgroup placing feeling better (+5) much more highly on an exemplary sort than the sample as a whole (+2). Also, the alcohol group endorsed feeling less angry (+2), isolated (+1) and guilty (+1) as after-effects, when the group as a whole did not (-1, 0, 0). After-effects endorsed by participants on factor 3 in this analysis appear to relate to social benefits in the 24 hours following substance use.

Participants who did not load

One participant's sort did not load exclusively onto any of the defined factors. This participant was male, met criteria for BDI, and reported his MPS to be alcohol. He reported that the most common after-effect was getting high/manic (+5) as well as feeling a buzz (+4). He also reported hallucinations (+4), an after-effect far less commonly endorsed by other participants. This participants also reported blacking out (+3) as a common after-effect of drinking, along with feeling he can do things he normally can't (+3).

3.5.4.2 Group differences between factors

As before, statistical tests were employed to explore whether there were any differences in the groups loading on factors 1, 2 and 3 in terms of categorical demographic, psychiatric or substance use characteristics. Full tables can be found in appendix 16, table 16.3.

Once again, there were few differences between the groups. A significant difference was detected regarding ratings on the Mania Rating Scale (MAS; H (2) = 7.40 p = 0.03). Post hoc tests using Mann Whitney U were conducted, with the significance level adjusted ($p < 0.03$) for multiple tests (Bonferroni correction). These tests revealed a significant difference in MAS scores between those loading on factor 1 (positive after-effects) and factor 3 (getting high) with those loading on factor 3 scoring more highly (U = 6.00, p = 0.01).

Differences were evident relating to working status also. Inspection of the adjusted residuals in cells indicated that a greater number of participants who reported negative after-effects were unemployed (100%) compared with those loading on factor 1 (50%) and 3 (75%), and a greater number of participants reporting positive after-effects were currently working (50%) compared to those on factor 2 (0%) and 25% on factor 3 (χ^2 (2) = 5.81, p = 0.04, FET).

A final non significant trend regarding days of alcohol use in the past month was detected (F (2, 21) = 2.97, p = 0.08).

3.5.4.3 Q Analysis - After-effects: Cannabis subgroup

Principal component analysis of the cannabis subgroup (*n*=21) for the after-effects sort resulted in a four factor solution. Of the 21 participants whose sorts contributed to this analysis, 19 loaded on one of these 4 factors, and 65% of the variance was explained. Two participants loaded exclusively on factor 1 (accounting for 13% variance); ten participants loaded on factor 2, one of which was inversed, (accounting for 16% variance); two participants loaded onto a third factor (accounting for 10% variance) and five people loaded onto a fourth, previously unidentified factor (accounting for 15% variance). Two participants' sorts did not load exclusively onto any one of the defined factors (one loaded on factors 1, 2 and 4 and another loaded on both factors 3 and 4). These sorts do not contribute to the interpretations below.

Interpretation of the factors

The factor arrays for this sort are presented in appendix 15, table 15.5.

Factor 1: Social Enhancement

An exemplary sort for participants loading exclusively on factor 1 shares many similarities to factor 1 (positive after-effects) obtained from the whole sample and factor 1 (positive after-effects) from the alcohol group. Cannabis users loading on factor 1 reported feeling a buzz (+5), feeling more confident (+4) and more sociable (+4) as well as more likeable (+3), and generally feeling better (+2).

However, feeling out of control (+3) as an after-effect of cannabis use, as well as having racing thoughts (+2) and getting high/ elated (+1) were all after-effects not endorsed for by participants loading on factor 1 earlier sorts (the unified sample or the alcohol group) so differentiate this subgroup.

Participants in the cannabis group who loaded on factor 1 did not report hallucinations (-5), feeling suicidal (-4), a better memory (-3) or flashbacks (-3) as after-effects of using cannabis. 'Stops me going high/elated' (-2) was not a reported after-effect of cannabis use for this group of participants, as was the case for those reporting positive after-effects in the whole group analysis.

There appears to be a heavy emphasis on socially positive after-effects for people loading on this factor, however, these results should be taken cautiously, considering this factor was made up of two participants only.

Factor 2 – Cognitive Enhancement

Like factor 1, factor 2 represents another group of cannabis users who endorsed positive after-effects of cannabis use, but also reported cognitive benefits following use. Cannabis helped this group to function better (+5), concentrate better (+3) have a better memory (+2). A crucial distinguishing after-effect reported only by those loading on this factor is that cannabis use stops

them going high/elated (+3). This group of cannabis users do not report racing thoughts (-4), depression (-2), feeling ill (-5), confused (-1) or feeling more bothered by past events (-1) – all of which are endorsed by those loading on factors 1, 3 and 4. Interestingly, those loading on factor 2 are also the only participants in this analysis to endorse feeling sexually aroused (+1) as an after-effect of cannabis use.

One individual's sort was directly inversed on factor 2, meaning they loaded on the opposite arrangement to those described above.

Factor 3: Negative after-effects

Participants loading on factor 3 reported the predominantly negative after-effects of cannabis use. An exemplary sort for factor 3 shares many features with that described for factor 2 (negative after-effects) in the whole sample. They felt anxious (+5), guilty (+4) and more sensitive to highs and lows (+4) and did not endorse feeling better (-4), feeling a buzz (-3) or feeling more confident (-2). Once again however these results should be taken cautiously, considering this factor was made up of two participants only.

Factor 4 – Personal/ Emotional after-effects

First examination of an exemplary sort representing factor 4 reveals many similarities with factors 1 and 2 – individuals loading on factor 4 felt less irritable (+5) and angry (+4) as an after-effect of cannabis use, they reported feeling generally better (+4) and felt a buzz (+3) although they acknowledged feeling tired (+3) and not feeling like talking to people (+3) as after-effects.

Positive statements endorsed by this subgroup appear to be internal and personal. Participants who loaded on factor 4 did not endorse statements related to social situations. For example, feeling more sociable (0), likeable (-1) or confident (0), in contrast with those loading on factor 1 (social enhancement) as discussed earlier.

However this group did also endorse negative after-effects of substance use as well as emotional benefits. For example, they feel worthless after using cannabis (+2), and more bothered by past events (+1). Cannabis makes this group of participants more sensitive to highs and lows (+2). Statements which distinguish this factor from others appear to be related to sleep. As already identified, individuals loading on factor 4 feel tried as an after-effect; interestingly, participants loading on this factor are the only to endorse disturbed sleep not to be after-effect of cannabis use, suggesting that cannabis use may aid sleep for these people.

3.5.4.4 Group differences between factors

Finally, statistical tests were employed to explore whether there were any differences in the groups loading on the four factors described in terms of categorical demographic, clinical or substance use characteristics. Full tables can be found in appendix 16, table 16.4.

Significant differences were detected regarding the number of previous depressive and manic episodes. Inspection of adjusted residuals in the cells revealed that 100% of individuals loading on the negative after-effects factor had experienced 8 – 19 episodes of depression, compared with 0% reporting this number of episodes loading on any other factor (χ^2 (6) = 15.30, p = 0.05, FET). With regard to previous episodes of mania, a significantly greater number of participants who reported negative after-effects had reported 8 – 19 manic episodes also (100% compared to 50% on factor 1; and 0% on both factors 2 and 4; χ^2 (6) = 14.73, p = 0.02, FET).

Furthermore, a greater number of participants loading on the cognitive enhancement factor (75%) reported more than 20 past episodes of mania, compared with 0% for those on factors 1 and 3 and 50% on factor 4 (χ^2 (6) = 14.73, p = 0.02, FET)

There was also a significant difference across the factors regarding the number of days of cannabis use in the past 28 (H (3) = 9.90 p = 0.02). Post hoc tests using Mann Whitney U were conducted, with the significance level adjusted (p < 0.2) for multiple tests (Bonferroni correction). These post hoc tests revealed a significant difference in days of cannabis use over the past month between those loading on factor 1 (social enhancement) who reported an average of 2.5 days use; and those on factor 2, cognitive enhancement, who reported an average of 11.72 days use (U = 0.00, p = 0.01).

3.6 Relationships between factors

Table 19: Relationships between reasons and after-effects of substance use

	Factor 1 *Positive after-effects*	***Factor 2*** *Negative after-effects*	***Factor 3*** *Getting 'high'*
Factor 1 *Mood management*	12 (46%)	12 (46%)	1 (4%)
Factor 2 *Social reasons*	11 (50%)	4 (18%)	5 (23%)

Table 19 provides frequency counts and percentages for how participants' sorts of reasons for substance use relate to their sorts of after-effects of substance use. The following comparisons are made purely on the basis of group percentages, and are not derived from the application of statistical tests. Equal numbers of participants (46%) who sorted the reasons for substance use in relation to mood management (factor 1) endorsed positive and negative after-effects. Of the participants who endorsed social reasons for use (factor 2), a higher number endorsed positive after-effects (50%) than negative ones (18%). Almost a quarter (23%) of those who endorsed reasons relating to social substance use also went on to load on the getting 'high' factor defined in the after-effects Q analysis.

CHAPTER 4:
Discussion

4. Discussion

The principle aim of this thesis was to investigate the self reported experiences of substance use by individuals with a diagnosis of bipolar disorder (BD). Stage 1 of the study employed Q methodology to identify any patterns in participants' reasons for substance use and to better understand the after-effects of that use. Stage 2 explored differences between patterns of substance use identified in stage 1 in terms of demographic, clinical or substance use characteristics.

This discussion provides an overview of the main results of the study accompanied by an interpretation with reference to previous findings. The strengths and limitations of the study are discussed followed by a consideration of possible clinical implications. Finally, suggestions for further research are proposed.

4.1 Summary of main results

Participants in this study commonly reported reasons for substance use related to relaxation, feeling calm and feeling good. A Q sort analysis of reasons for use revealed two broad ways in which participants sorted statements relating predominantly to mood management or social substance use. A secondary Q sort analysis of participants sorting reasons for their *alcohol use* revealed similar results to those of the whole sample. However, secondary Q sort analysis of the group of participants sorting reasons for *cannabis use* revealed a subgroup endorsing reasons related to the management of high mood. Furthermore, a separate subgroup of those sorting according to cannabis use report their use is for reasons of cognitive enhancement.

The main after-effects of substance use endorsed by participants in this study included a mixture of positive effects such as feeling better, and negative effects such as memory loss and guilt. Q sort analysis of after-effects revealed three factors which broadly represented: those who experienced positive after-effects, those who experienced negative after-effects, and those whose after-effects were associated with feeling high. Once again, subgroup analysis of the participants reporting after-effects of *alcohol* use revealed similar results to that of the whole group analysis, while interpretation of the *cannabis* subgroup suggested a differentiation between social, cognitive and personal benefits, with a number of the cannabis subgroup reporting negative after-effects also.

4.2 Reasons for substance use

4.2.1 Main reasons for substance use

The reason for substance use most frequently endorsed by participants in this study was 'helps me to relax' (90%), which was also reported as the most important reason for use by 8% of participants. Other frequently endorsed reasons included 'makes me feel calm', 'helps me switch off' and 'makes me feel good'. The most common main reason for substance use was 'helps me manage low mood' which was reported as the main reason for use by 10% of participants. Socially motivated reasons such as 'makes me more sociable' and 'boosts my confidence' were endorsed by just over a half of the group (56% and 54% respectively).

Similar patterns were evident when the sample was broken down by self reported most problematic substance (MPS: alcohol or cannabis). The most frequently endorsed reason for both groups remained 'helps me to relax' while 'helps me to switch off' appeared an equally common reason across groups. However, participants reporting their MPS to be alcohol more frequently endorsed drinking to reduce anxiety while those reporting reasons for cannabis use reported use to make them feel good. While almost three quarters of the alcohol group endorsed drinking to make them more sociable and more confident, only one third of those who reported cannabis as their MPS endorsed these socially motivated reasons.

Reasons related to coping with symptoms of BD such as managing low mood, slowing down racing thoughts, irritability and restlessness were also endorsed by over half of all participants. Other coping reasons such as managing voices and visions and relieving the side effects of medication did not appear so important and were only endorsed by 12% of the whole group or less.

In terms of main reasons for substance use, those reasons most commonly endorsed by the participants in this study broadly compare with other reasons for use studies across clinical and non-clinical samples. Relaxation was the most common reason identified by individuals in this sample, a reason which has been frequently cited as an important reason for cannabis use in the general population (Johnston & O'Malley, 1986); a psychosis sample (Schaub et al., 2008); has been identified as a key reason for alcohol in BD samples (Morriss et al., 2011) and as a key reinforcer of alcohol use (Young & Oei, 2000). Substance use to feel calm, switch off and feel good are broadly comparable reasons for use to those which are reported in other studies such as those with individuals with psychosis (Gregg et al., 2009a; Spencer et al., 2002) and mixed samples including individuals with BD (Warner et al., 1994).

Social reasons for use such as 'makes me more sociable' and 'boosts my confidence' were endorsed by just over half of the current sample, suggesting that similar to studies of reasons for use in the general population (see Kuntsche et al., 2005), social reasons play an important role in the motivation for substance use in this group. However, in line with BD specific research, social

reasons did not appear to be key motivations for all individuals in this study. Although Warner et al (1994) reported that social motivations were endorsed by up to 73% of respondents in a mixed psychiatric sample, of whom 34% were diagnosed with BD, studies investigating reasons for use reported in BD specific samples have reported lower levels of social motivations. Reasons such as being able to participate in social situations were endorsed by 33% of participants with co-occurring BD and substance use disorder (SUD; Bizzarri et al., 2007b). The results of this study are consistent with previous research which suggest that social reasons do not appear to be the main motivations for substance use for individuals with BD, though clearly they are important for some.

Frequency counts of reasons for use appear to support previous BD-related research regarding substance use to cope with low mood. In line with Weiss et al (2004), who found that more than three quarters (77%) of a sample of 45 participants with BD and SUD reported using substances to cope with depression, 74% in the current study endorsed substance use to cope with low mood. For 10% of participants, this was identified as the most important reason for use.

It has been reported that achieving or maintaining a 'sense of euphoria' is a substance use motivation endorsed by 32% – 86% participants with BD (Bizzarri et al., 2007a; 2007b). In the current sample, this reason was endorsed by 36% of participants. More commonly, individuals in this study reported substance use to reduce symptoms related to high mood, such as to feel less irritable, less restless and slow down racing thoughts; reasons also endorsed by over half the sample in Weiss et al (2004).

Warner et al (1994) reported that 11% of a sample of psychiatric patients with SUD endorsed substance use related to hallucinations. It is possible that this result was due to the proportion of participants with psychosis (66%) in the sample, as reasons for use relating to psychotic symptoms such as to help manage voices and visions were endorsed by only 8% and 4% respectively in the current study. Moreover, across the whole sample, participants did not regularly endorse substance use to alleviate side effects of medication (12%), however when frequency counts for reasons endorsed were produced for the alcohol and cannabis subgroups, it was apparent that use to alleviate the side effects of medication, although still relatively low, was more commonly a reason for use amongst participants who reported their MPS to be cannabis (24%) than alcohol (7%).

4.2.2 Q sort results

Factor analysis of the reasons for use sort revealed two distinct factors:

1. Factor 1 represented those individuals who predominantly reported substance use for mood management. These participants used substances to feel calm, to help them sleep and to reduce anxiety and restlessness. Reasons endorsed by this group related both to

symptoms of mania such as racing thoughts, and symptoms of depression such as low mood. Fifty two per cent of participants loaded on this factor.

2. Factor 2 was made up of 44% of the group and contained individuals who reported using substances for predominantly social reasons. They used substances to become more sociable, confident and to join in with what family and friends were doing.

Mood management

As noted, a subgroup of participants in this study described their substance use in relation to the management of their mood. Previous studies have suggested that an explanation for a high co-occurrence of SUD in BD is due to the use of substances to cope with distressing symptoms (Bolton et al., 2009; Sonne et al., 1994; Weiss et al., 2004) and relief of unpleasant affective states (Warner et al., 1994). In a randomised controlled trial testing integrated group therapy for patients with BD and SUD (Weiss et al., 2004), participants reported symptoms such as depression (78%), racing thoughts (58%) and irritability (58%) as their main reasons for initiating substance use. Furthermore, Sonne et al (1994) reported that 94% of participants with co-occurring BD and SUD reported substance use to help their mood, be that when feeling depressed or manic. Additionally, Bolton et al (2009) presented data taken from the National Epidemiological Survey on Alcohol and Related Conditions (NESARC) where 41% of respondents with BD reported using substances to improve their mood at some point in their life, though interestingly this study suggested that self medication of symptoms occurred more frequently in depressive episodes (41%) than in manic episodes (28%). Finally, Bizzarri et al (2007a) highlighted the self medicating role of substance use in patients with BD and co-occurring SUD, describing the use of substances to alleviate affective symptoms and distress. The authors found mood regulation to be very common among BD populations with SUD (Bizzarri et al, 2007a). Similarly, Bizzarri et al (2007b) found significant numbers of their sample endorsed the use of substances to improve mood (79%), relieve anxiety (79%) and tolerate sadness (60%).

The emergence of a group of individuals in this study who reported using substances to manage their mood is consistent with the studies reported above. The self report literature appears to support the theory that a subgroup of participants with BD use substances in some way to manage symptoms, in line with a self medication hypothesis of substance use (Khantzian, 1985; 1997). This hypothesis posits that individuals who experience mental illness select the use of certain substance to ameliorate symptoms. However, mood related reasons for use are only reported by a sub-set of individuals and, apparent in self report literature is that, in fact, individuals without a mental health diagnosis also report mood related reasons for substance use such as to relieve mood, anxiety and social phobia symptoms (Bizzarri et al., 2007b).

The finding that a subgroup of individuals in this study endorsed substance use for mood regulation is consistent with findings from samples with major depressive disorder (Arendt et al., 2007; Leibenluft et al., 1993; Weiss & Mirin., 1987) and anxiety disorders (Robinson et al.,

2009). However, several of these studies (Arendt et al., 2007; Weiss & Mirin, 1987) have also concluded that this self medication is present in both clinical samples and their non-clinical controls, further suggesting that self medication may also occur in individuals without clinical diagnosis.

Direct comparison with results from other clinical samples would serve to distinguish which reasons for use may be specific to BD. Gregg et al (2009a) report results of a Q study of reasons for substance use in a psychosis sample, where a subgroup of individuals endorsed using substances to 'cope with distressing emotions and symptoms'. This factor bears resemblance to the mood management factor in the current study, in that exemplars used substances when they felt depressed and anxious, though participants in Gregg et al (2009a) also reported reasons related specifically to coping with the symptoms of schizophrenia, such as feelings of suspicion or paranoia and auditory hallucinations. Comparatively, the mood management subgroup in the current study alluded more to the management of high and low mood, suggesting that coping reasons for use may be specifically linked with the symptoms of the clinical group in question. Individuals with BD experience extreme fluctuations in mood and the results of this study suggest that some may use substances to help them to manage those fluctuations.

Social reasons

A second group of participants in this study endorsed using substances for social reasons. This finding suggests that, as seen in the general population, substance use for some individuals with BD relates to being more sociable, more confident and having a good time with family and friends. Previous research in the general population (Stewart et al., 1996); mixed samples (Warner et al., 1994) and samples of individuals with BD (Healey et al., 2009; Morriss et al., 2011) has indeed suggested that social reasons are important motivations for use. For this group, feeling good is the most important reason for using substances. Healey et al (2009) described a common theme to emerge from qualitative interviews with individuals with BD and current or past SUD to be 'enjoying the effects of substances'. This theme did not relate to symptoms of BD, rather it was related to having a good time. Healey et al (2009) concluded that many reasons for use offered by participants with BD were in fact comparable to reasons given by the general population, such as to manage stress, socialise and fit in with friends. Three studies by Bizzarri and colleagues (2007a; 2009; 2007b) have clearly concluded that increasing confidence and feeling at ease in social situations are commonly endorsed reasons for people with BD, concluding that many other reasons unrelated to mood regulation may be associated with recourse to substance use (Bizzarri et al., 2007b).

4.2.3 Group differences

Following each Q analysis, factors were examined to see whether there were any differences between the people loading on each factor in terms of demographic, clinical or substance use characteristics. Where differences were detected, findings should be interpreted with caution due to the application of multiple testing, discussed further in 'limitations'. A key finding was that the majority of participants in the whole group sort who reported substance use predominantly for mood management had identified their MPS to be cannabis. This finding is consistent with a paper which presents the anecdotal accounts of five individuals with BD, who report the benefits of cannabis use in relation to symptoms of mania and depression (Grinspoon & Bakalar, 1998). Participants described the benefits of cannabis use in treating high and low mood over conventional prescribed treatments, and further reported cannabis use to manage side effects of pharmacological medication. Future research should explore the use of cannabis and its role in medicating symptoms, as the sample in Grinspoon and Bakalar (1998) is very small and the authors provide no description of systematic data collection.

Healey et al (2009) described accounts of participants ceasing alcohol use but continuing cannabis use when their mood became low, suggesting that for some, cannabis use may be perceived as more useful for mood management, whereas alcohol is more useful during euthymia. Studies of reasons for use reported by individuals with BD have investigated alcohol (Morriss et al., 2011) and opiate use (Bizzarri et al., 2007a) or more commonly report on samples using various substances (Bizzarri et al., 2007b; Bolton et al., 2009), suggesting a need for further quantitative exploration of cannabis use in BD.

Studies in the general population (Abbey et al., 1993; Cooper, 1994; Johnston & O'Malley, 1986) and psychosis samples (Gregg 2009b; Spencer et al., 2002) have found direct links between coping reasons for substance use and amount of substance used, suggesting that coping reasons are more commonly cited by individuals using substances more heavily. Bolton et al (2009) found that participants with mood disorders who reported self medication exhibited patterns of worsening mental health after controlling for socioeconomic factors and alcohol and drug use disorders. Self medication was significantly associated with a higher likelihood of anxiety and personality disorders compared with participants who did not report self medicating. The current study did not find that individuals who reported substance use for mood management differed in terms of the clinical outcomes measured. This result may suggest a difference between individuals with a diagnosis of BD and other samples referred to, though may also be due to the relatively small sample size in the current study or the way substance use was recorded.

There was a non-significant trend for those participants loading onto the mood management factor to be single and unmarried. Mazza et al (2009) reported that individuals with co-occurring BD and SUD were more likely to be male and single or divorced. Bolton et al (2009) reported that individuals with mood disorders who reported self medication reasons for substance use were more likely to be divorced or widowed. No gender differences were evident in the current

study; however future research should explore relationships between individuals' attempts to medicate mood symptoms with substances and socio demographic characteristics further. Such findings could direct specific clinical interventions.

Finally, though not statistically significant, participants who sorted reasons according to mood management reported a greater number of previous manic episodes (more than 20) than those who sorted for social reasons, who more commonly reported less than seven. It is possible that those individuals who experience more common or severe symptoms of BD, such as increased relapses, use substances to manage those symptoms to a greater extent; though equally possible that those who 'medicate' mood with substance may experience more negative outcomes, as has been suggested in psychosis samples (Gregg et al., 2009b; Spencer et al., 2002) and the general population (Abbey et al., 1993; Cooper, 1994; Johnston & O'Malley, 1986). No assumptions can be made based on the current findings due to the cross-sectional nature of the study, so further investigation of a possible association would require testing in a longitudinal study in order to make causal interpretations.

4.2.4 Alcohol and cannabis subgroups

4.2.4.1 Alcohol subgroup

When Q analyses were run separately for the alcohol subgroup, a similar pattern of responses were seen as in the whole group analysis.

Sixty nine per cent of the alcohol group reported predominantly mood related reasons for their alcohol use. This is consistent with findings by Sonne et al (1994) who reported that from a group of individuals with a diagnosis of BD and SUD who reported self medicating their mood with substances, 38% used alcohol or another depressant to decrease mania, and 29% used alcohol specifically when depressed. When further analysis in the current study explored differences between those endorsing mood management reasons with other participants, the mood management group reported a significantly higher level of education. To the author's knowledge, no previous studies have found associations between educational achievement and reasons for alcohol use. Further research would require the recruitment of participants based on educational level in order to directly test the hypothesis that level of education is related to reasons for substance use.

The mood management subgroup also showed a trend to score more highly on the Mania Rating Scale (MAS), though this difference was not significant. It is possible that individuals who were experiencing elevated mood during the study period were more likely to sort reasons for use related to their current mood state, or that individuals who experience high mood generally use substances in response to that affect, however, these hypotheses would require thorough investigation before firm conclusions could be drawn.

For the alcohol group, those who loaded on the social factor (31%) tended to also endorse slightly more coping related reasons, thus, it was referred to as a social coping group. This subgroup of participants reported alcohol use to socialise and be more confident, but also to cope with painful memories, which may be a common expectancy specifically associated with alcohol use. Drinking motives research in the general population has commonly cited 'drinking to forget' as a reason for alcohol use (Cooper, 1994; 1995); it may be that a subgroup of individuals with a BD diagnosis also uses alcohol to this end. This group acknowledged that cravings and dependency played important roles in motivating alcohol use, potentially specific to the alcohol group due to the physically addictive nature of alcohol. That a subgroup of individuals with BD endorsed alcohol use for social reasons is consistent with previous research (Morriss et al., 2011; Warner et al., 1994).

4.2.4.2 Cannabis subgroup

Analysis of the cannabis group revealed three factors. Fifty seven per cent of participants who sorted reasons for cannabis use formed a mood management group. However, in contrast to earlier analyses, these participants appeared to endorse reasons more specifically related to the management of high mood or mania, such as substance use to help them sleep, slow down racing thoughts, and stop them feeling too high.

Previous studies have reported substance use to reduce symptoms of mania (Bolton et al., 2009; Morriss et al., 2011; Weiss et al., 2004). Healey et al (2009) reported within the theme 'living with a serious mental illness', patients described the use of substances to reduce or control symptoms of mania, or "*putting a lid on the high*"; and further within 'experimenting in the early course of the illness' that cannabis was used by participants to "*bring them down*" – as they had always had the vision that cannabis was something that was used to "*chill you out"*, however no study since has identified the specific role of cannabis to this end. In contrast to studies which have suggested that self medication occurs most commonly in depressive episodes (Bolton et al., 2009; Weiss et al., 2004), it is possible from results of the current study that for a subgroup of cannabis users, cannabis use is motivated by mania symptoms. Anecdotal evidence from Grinspoon and Bakalar (1998) suggests that, this is the case for all five of the participants with BD presented, though as previously noted, due to lack of empirical evidence regarding the use of cannabis in relation to mania, more research is required before conclusions can be drawn.

A slightly smaller proportion of the cannabis group (14%) reported use for social reasons. This group endorsed reasons similar to those seen in the social factor for the whole sample. They reported using cannabis to make them more sociable, confident, to help them to fit in, and join in with what family and friends are doing. The emergence of this subgroup of cannabis users is consistent with findings in the general population (Lee et al., 2007). The latter study reported

the most common reason for cannabis use in a sample of 634 students to be enjoyment/ fun, and social enhancement to be a significant predictor of use.

A further 19% of the cannabis group made up a new factor. This group endorsed reasons for use related to a mixture of mood management and social reasons though specifically reported the role of cannabis in cognitive enhancement. They endorsed use to help them to think, focus, and function, increase their creativity and help them to deal with problems.

This factor had not been identified in any of the previous analyses and again suggests that some participants in the current study may use cannabis to improve mental functions such as thinking, focussing, dealing with problems and being creative. Although no previous study in BD patients has explicitly reported substance use to improve focus, it is possible that other symptom-related reasons commonly reported such as use to reduce depressed mood or manic symptoms may indirectly affect the ability to focus. Participants belonging to this group were the only participants to endorse 'to get/ stay high/elated' as a reason for substance use. Studies have reported substance use to achieve or maintain mania (Bizzarri et al., 2007a; 2009; 2007b), though samples were made up predominantly of opiate users (Bizzarri et al., 2007a) or included participants using a number of substances including opiates, hallucinogens and sedatives (Bizzarri et al., 2009; 2007b), whose psychological effects differ from those of cannabis. However, it is possible that a subgroup of participants use drugs to enhance manic experiences, and the explanation for low numbers endorsing this in the current study is the inclusion of only alcohol and cannabis users. Research comparing reasons for use of a broader range of substances may clarify this further.

Emergence of an individual enhancement factor was reported by Gregg et al (2009a; 2009b), in a sample of participants with schizophrenia. This subgroup of individuals reported substance use to aid concentration, energy and be more creative. It is possible that the emergence of a subgroup of cannabis users reporting cognitive enhancement reasons for use in the current study is consistent with the subgroup in Gregg et al (2009a). However, when the individual enhancement sub scale was further tested in a larger sample of participants (Gregg et al., 2009b), no association was found between enhancement and cannabis specifically. In fact, individuals belonging to this cognitive enhancement factor were predominantly users of substances other than alcohol and cannabis. It is possible that cannabis use for some individuals with BD serves to aid cognitive functioning to some extent, but these finding require further exploration before any firm conclusion can be drawn.

Analyses revealed no differences between the three groups of cannabis users according to demographic, clinical or substance use characteristics.

Taken together the results suggest that there may be distinct differences in the reasons for use of different substances, a finding which if replicated in longitudinal studies with large samples of

individuals with BD using a broad range of substances, may have important clinical implications. For example, such findings may direct approaches for the specific treatment of the use of different substances.

4.3 After-effects of substance use

4.3.1 Main After-effects of substance use

The most commonly endorsed after-effect of substance use was tiredness. A mixture of positive and negative after-effects were endorsed by many participants, for example, a large proportion of individuals reported feeling better while a similarly high proportion experienced memory loss and felt guilty. Few participants endorsed feeling suicidal in the 24 hours following use of their MPS, and fewer still reported experiencing hallucinations.

For the alcohol group, tiredness remained the most frequently endorsed after-effect, and was closely followed by guilt and memory loss while for the cannabis group, memory loss was the most common after-effect followed by feeling less irritable and feeling less high/ elated.

After-effects which were not commonly endorsed by the group as a whole or when participants were separated by MPS included feeling suicidal, having hallucinations or feeling sexually aroused. Specifically, participants sorting according to alcohol use rarely endorsed having a better memory as a result of drinking, and those sorting according to cannabis use rarely endorsed blacking out or experiencing flashbacks in the 24 hours following use. Furthermore, only 19% of the cannabis group endorsed feeling depressed as an after-effect of substance use, compared with 48% of the alcohol group. That self reported after-effects of alcohol use in this study appear to be more negative than those for cannabis use may be due to several factors, such as public health advice relating to drinking or specific medical advice for individuals with mental health conditions related to mixing alcohol with prescribed medication. Alternatively, this result may be explained by the high levels of alcohol consumption reported by participants in this study.

Research relating to outcomes of substance use in BD suggests that the long term consequences of abusing substances for someone with BD are negative. These include amongst many, poor adherence to treatment (Goldberg et al., 1999); suicidality (Potash et al., 2000); and a greater number of hospitalisations (Cassidy et al., 2001). Self reported after-effects however, have been less extensively investigated.

After-effects commonly endorsed by the alcohol group alone were both positive and negative, though in comparison, after-effects endorsed by the cannabis subgroup were predominantly beneficial. It is possible that positive expectancies of immediate effects outweigh any longer term potential negative effects.

4.3.2 Q sort results

Q analysis of the after-effects sort revealed 3 factors:

1. Factor 1 was exemplified by 48% of the whole sample and described a majority of positive after-effects including social benefits such as feeling more likeable, confident and sociable and personal benefits such as concentration, motivation and focus. Participants loading onto this factor acknowledged very few negative after-effects, placing hallucinations, flashbacks and paranoid feelings on the far negative side of the response grid.
2. Factor 2 contained 32% of participants and described far more negative after-effects. Participants loading on factor 2 felt ill, anxious, guilty, scared, worthless and depressed in the 24 hours following substance use. This group reported very few positive after-effects, though did not endorse hallucinations of suicidal feelings following use of their most problematic substance.
3. Factor 3 contained the remaining 14% of participants in the whole sample who endorsed a mixture of positive and negative after-effects. This group reported feeling confident and sociable in the time following alcohol or cannabis use, though also reported feeling paranoid, ill and blacking out. They also reported enhancement related after-effects of substance use such as feeling a buzz and getting high/ elated.

<u>Positive after-effects</u>

Participants on factor one endorsed the predominantly positive after-effects of substance use. They felt better in the 24 hours after using a substance and also reported social benefits such as feeling more confident, likable and sociable. Furthermore, they endorsed after-effects related to mood such as feeling less angry or irritable, more motivated and being able to function better. Participants in this group reported the improvement of symptoms related to BD; as a result of substance use they felt their thoughts slow down, and reported that substance use stopped them from feeling too high. One study exploring reasons for substance use in relation to self medication (Weiss et al., 2004) also investigated perceived symptom improvement following substance use. Participants taking part in a randomised controlled trial of integrated group therapy for BD and SUD were first asked to report their reasons for use, followed by rating the effect of that substance on symptoms. Effects were categorised into improving symptoms, worsening symptoms or having no effect either way. Two thirds, (66%) of the sample in Weiss et al (2004) reported improvement of at least one BD symptom as an effect of using a substance. In the same study, participants in the treatment as usual condition, who perceived symptom improvement from their substance use, were more likely to continue that use. This result was not seen in the group who were receiving integrated group therapy (IGT), suggesting that IGT may only be a successful treatment for participants who perceive benefits from substance use. This result highlights the important role of personal experiences in treatment for

SUD. Healey et al (2009) concluded that substance use in early life may be relatively uncontrolled, but as use continues, individuals may learn from experiences; some to abstain from or reduce use, and others who perceive that they learn to control the adverse effects, and so regard substance use as valid a way of medicating symptoms as prescribed medication.

Bizzarri et al (2009) compared participants with psychosis and co-occurring SUD to those with psychosis alone, 63% of whom were diagnosed with BD using the Structured Clinical Interview for the Spectrum of Substance use (SCID-SUBS; Sbrana et al., 2003). Participants with co-occurring psychosis and SUD scored significantly higher than their controls on a substance sensitivity domain of the assessment. The authors concluded this result to be consistent with research involving patients with schizophrenia (D'Souza et al., 2006) which has suggested that individuals with psychosis experience 'exaggerated positive responses' to alcohol with small amounts. This finding requires further investigations in individuals with BD.

The results of the current study, taken with the findings presented above suggest that although long term negative outcomes undoubtedly occur in individuals with co-occurring BD and SUD, if treatments are to be designed to support this group, it would be beneficial to acknowledge some of the positive effects of substance use as well as identifying the negative consequences.

Negative after-effects

A second group of participants reported the predominantly negative after-effects of substance use. These individuals reported feeling ill as an after-effect of using substances, and felt anxious, depressed, scared, guilty and worthless. This group did not endorse any positive after-effects, instead they reported the socially and emotionally negative consequences of use.

Bender, Griffin, Gallop and Weiss (2007), tested a 'consequences of use' scale in a sample of participants with BD and SUD. This scale was adapted from the Short Inventory of Problems – Recent (SIP-R; Miller, Tonigan & Longabaugh, 1995), a questionnaire designed to assess the negative consequences of alcohol use. The adapted scale was found to be psychometrically sound in a sample of 57 patients with co-occurring BD and SUD. Negative consequences of substance use endorsed by all participants included physical, social, interpersonal, intrapersonal and impulse consequences suggesting that individuals with BD recognise the negative consequences of their substance use despite continuing that use. However, a limitation of this scale is the lack of recognition of positive consequences of substance use – which the current study suggests may be relevant, meaning that there may be an inherent bias towards negative consequences in Bender et al (2007). However, the current study does support the conclusion that at least some of the population experiences negative after-effects to their substance use.

Getting 'high'

A final group of participants sorting after-effects reported slightly different experiences. Like the first, this group also endorsed primarily positive after-effects; however they also endorsed feeling

a buzz in the 24 hours following substance use. This theme emerged in interviews reported by Healey et al (2009), when discussing reasons for substance use, as some participants reported that alcohol use could bring on a high. It appears that feeling an affective shift following substance use may not only be a reason for use for some individuals (Bizzarri et al., 2007a; 2007b), but also an after-effect of use for others. As the author is unaware of any direct investigation of after-effects related to substance use in people with a diagnosis of BD, future research is required to investigate this suggestion further.

4.3.3 Group Differences

Once again, following each Q analysis, factors were examined to see whether there were any differences between the people loading in terms of demographic, clinical or substance use characteristics. As previously noted, the following interpretations are made with caution due to their emergence as a result of multiple testing. In the whole sample analysis, the majority of participants loading on the positive after-effects factor did not meet criteria for alcohol abuse or dependence. Further research would be required to establish causal inferences from this finding, but it is possible that individuals who did not report harmful alcohol use (did meet criteria for abuse or dependence) perceive or experience more positive after-effects from use.

Furthermore, it is possible that these participants were using substances in lesser amounts than those loading on other factors. Due to the fact that participants in the study were using both alcohol and cannabis, it was not possible to calculate equivalence of substances in terms of amount, hence it was not possible to compare amounts across the whole group. Qualitative data from Healey et al (2009) suggests that negative after-effects may be related to amount of use, with one participant reporting that too much substance use leads to negative consequences. However Weiss et al (2004) found no differences in terms of substance use details for participants regardless of whether they reported improvement from substance or not.

Although not statistically significant, a large majority of those reporting cannabis as their MPS made up the positive after-effects group and fewer participants in this group were sorting according to alcohol use. In a mixed sample of psychiatric patients, Warner et al (1994) gathered details of the effects of participant's preferred substance on symptoms of their illness in the 3 months prior to appointment. Cannabis users were more likely to report beneficial effects of substance use which included reduction of anxiety, depression and physical symptoms. Warner and colleagues also found that cannabis users reported lower hospitalisation rates, and scored lower on activation ratings than other substance users and control participants. One possibility for this difference is that individuals with more severely impaired mental health have less access to access illicit substances (Mueser et al., 1990). Alternatively, the effects of cannabis may be calming for certain individuals who have experimented at great length with how it affects their mood. Healey et al (2009) reported a theme from interviews, that following initial experimentation with substances, individuals either learned to abstain from substance use, or

learned to limit negative effects by monitoring consumption and having an awareness of mood change and context. Warner et al (1994) suggests that some cannabis users may have become expert with regards how to tailor their use to suit their needs.

4.3.4 Alcohol and cannabis subgroups

4.3.4.1 Alcohol subgroup

When the Q analysis was run separately for the alcohol subgroup, similar factors emerged as those described for the whole group. Twenty one per cent of the alcohol group endorsed positive after-effects – though they reported that alcohol use did not stop them from feeling high/ elated, as had been reported by the positive after-effects group in the whole sample.

The largest proportion of the alcohol group endorsed negative after-effects (34%). Exploration of this factor also revealed many similarities with that of the whole group. In the study reported above, Warner et al (1994) gathered details of the effects of participants preferred substance on symptoms of their illness in the three months prior to assessment. Those participants reporting effects of alcohol use specifically reported negative effects on anxiety, depression and physical symptoms.

Analysis of any features differentiating this group of participants from others revealed that participants who loaded on this factor were more likely to be currently unemployed, while those endorsing positive after-effects of alcohol were more likely to be currently working. These findings may suggest the possibility of an association between after-effects of substance use and employment status, though it is likely that alternative, un-measured variable such as amount of use mediates this trend. Further research is necessary to clarify this.

Finally, 28% of the alcohol group endorsed enhancement related after-effects. For this group, feeling better was the most important after-effect. They also reported feeling less angry in the time following use of alcohol. However, this group also acknowledged feeling isolated and guilty as after-effects. Exemplars of this factor showed significantly higher ratings on the Mania Rating Scale (MAS; Bech et al., 1978) than the first subgroup of participants reporting their MPS to be alcohol, who reported predominantly positive after-effects. It is possible that if participants' mood was elevated when completing the Q sort, they perceived the effects of substances differently. It could also suggest that they experience more regular mood fluctuation or, in fact, that this subgroup of participants show a greater sensitivity to substances – a result which would be consistent with a shared vulnerability model of SUD and BD.

Analysis in stage 2 also revealed a non-significant trend for a difference between the three subgroups according to number of days of alcohol use in the previous month. As this trend was

non-significant, post hoc analyses were not appropriate, however further research should explore this in a larger sample, as the trend could be consistent with the suggestion that substance use in lesser amounts may have less harmful effects for some individuals (Healey et al., 2009).

4.3.4.2 Cannabis subgroup

For the cannabis subgroup, four patterns of after-effects emerged. These described after-effects related to social enhancement, cognitive enhancement, negative experiences and finally, personal/ emotional after-effects.

The first group contained 10% of the cannabis subgroup and predominantly described the socially positive after-effects of use, such as feeling more likeable and confident. After-effects endorsed by this group of cannabis users could be compared to those in earlier analyses reporting the beneficial after-effects of substance use.

A second group (43%) described mainly positive after-effects, but this time related with cognitive benefits such as concentrating and functioning better, having a better memory and crucially the prevention of high/ elated mood. The emergence of this group may, to some extent, reflect those substance users identified by Bizzarri et al (2007b) who associate substance use with an increase in energy and an improvement in performance – a small group in the current study due to an under representation of participants using substances other than alcohol and cannabis. A number of variables differentiated this group of participants from others. Firstly, this group reported a greater number of past manic episodes, and secondly, they reported a significantly greater number of days of cannabis use than those belonging to the first factor described. That these features differentiate a subgroup of cannabis users from others may be an important finding. Research in the general population suggests that participants who use alcohol in relation to enhancement tend to report heavier drinking (Carey, 1993). Although this group were describing the after-effects of substance use, rather than their reasons for use, it is relevant that future investigation could explore this further.

A third group of participants (10%) reporting their MPS to be cannabis endorsed negative after-effects, such as feeling anxious and guilty, and being more sensitive to highs and lows. A number of variables differentiated this group from other participants. They were significantly more likely to report 8 – 19 episodes of mania and depression than participants loading on other factors. Stirling et al (2011) reported the development of the Cannabis Experiences Questionnaire (CEQ), a questionnaire designed to capture the immediate and delayed effects of cannabis use. The scale comprises three subscales eliciting the immediate (pleasurable and psychosis-like) and after-effects of cannabis use. Principal component analysis of the after-effects subscale in a sample of 532 university students (Barkus & Lewis, 2008), revealed two further subscales, termed by the authors as a-motivational after-effects and psychosis like after-

effects. Barkus and Lewis (2008) reported that cannabis using, high scoring schizotypes, as measured by the Schizotypal Personality Questionnaire (SPQ; Raine, 1991), were more likely to experience psychosis-like after-effects following cannabis use. Due to the after-effects subscale in the CEQ comprising only negative after-effects, consideration of any links between positive after-effects and psychopathology is not possible. However, results from Barkus and Lewis (2008), and the finding in the current study that negative after-effects are more commonly reported by cannabis users who report a greater number of past episodes of mania and depression, may highlight that an area for further investigation, is the possibility of a link between severity of symptoms and symptom related negative consequences of cannabis use.

The final group of those who reported their MPS to be cannabis (24%) described the personal and emotional positive after-effects of use such as feeling less irritable and angry though concurrently, this group also reported negative after-effects also including feeling worthless and feeling more bothered about past events. Considering this was the smallest group to emerge from analysis, with only two participants sorting after-effects in this way, further research is necessary to explore whether this result would be replicated in a larger sample.

4.4 Relationships between the two sorts

Frequency counts of how sorts of reasons for substance use relate to sorts of after-effects of substance use revealed equal numbers of participants who loaded on the mood management factor, endorsing positive and negative after-effects. Of the participants who endorsed social reasons for use, a higher number endorsed positive after-effects than negative ones. To date, research investigating relationships between reasons for use and after-effects with individuals with BD and SUD is, to the author's knowledge, unavailable. As previously noted, the CEQ, (Stirling et al, 2011) allows for the differentiation of the immediate and after-effects of substance use, supporting the relevance of treating these concepts as distinct in the current study. Further exploration of the relationships between reasons for, and after-effects of substance use may have particular relevance clinically, considering that the results of this study are consistent with previous findings regarding the idiosyncratic personal experiences of substance use for individuals with BD who use substances (Healey et al., 2009).

Interestingly, some studies investigating both reasons for use and subjective effects of use in individuals with schizophrenia have also found expectancies of substance use do not necessarily match with the actual reported effect (Addington & Duchak, 1997). Future research should seek to clarify this incongruity in individuals with BD, as its identification in a clinical setting may help individuals to start to consider making changes in their substance use.

Almost a quarter (23%) of those who reported social substance use also loaded on the getting high factor defined in the after-effects Q analysis. Morriss et al (2011) investigated reasons for

substance use in relation to outcomes across a 72-week follow up period with a sample of participants with a BD diagnosis who were involved in randomized controlled trial of cognitive behavioural therapy. Drinking to relax was associated with improved ratings on the Social Adjustment Scale (SAS; Morriss et al., 2007), a measure of social function, in 3 subsequent follow up periods following reasons for alcohol use being collected. The findings of the current study are to some extent consistent with those of Morriss et al (2011), which suggest that it may be beneficial to recognise the perceived benefits of substance use reported by individuals in order to promote changes clinically.

4.5 How do results contribute to our understanding of the high co-occurrence?

The results of this study are consistent to some extent with a self medication hypothesis of substance use in BD (Khantzian, 1985; 1997). A sub-set of participants who completed this study endorsed reasons for substance use directly related to the symptoms of BD, such as low and high mood. Previous studies have concluded that the symptom most commonly associated with self medication is depression (Weiss et al., 2004). However the results of the current study suggest that some individuals may use substances to also medicate the symptoms of high mood, results which are consistent with those of previous studies (e.g. Bolton et al., 2009; Healey et al., 2009; Morris et al., 2011; Weiss et al., 2004) where reasons related to high mood have been reported.

Furthermore, in the analysis of reasons provided by the whole sample, mood management appeared to be related to the regulation of both manic and depressed symptoms, however exploration of the cannabis subgroup suggested that for a group of participants in this study, cannabis use may have been specifically related with the management of symptoms of high mood such as racing thoughts and irritability. It is possible that cannabis may be selected specifically for the role of managing symptoms of mania, consistent to some extent with the medicinal and recreational benefits of cannabis use (e.g. relaxation) reported by The British Medical Association (1997).

Some investigators have attempted to explain the co-morbidity levels between SUD and BD by suggesting that the two disorders share common risk factors. The Behavioural Activations Systems (BAS) hyper-sensitivity theory of BD and SUD (Depue & Iacono, 1989) for example, suggests that individuals who are vulnerable to BD may have a particularly sensitive behavioural activation system which reacts excessively to certain cues. A sub-set of participants in this study were found to report reasons for cannabis use related to cognitive enhancement such as to increase motivation, focus and creativity and help them to deal with problems. Previous studies including individuals using substances other than alcohol and cannabis have reported enhancement motives to even greater extent (Bizzarri et al, 2007a; 2009; 2007b), so it is

possible that further exploration of this subgroup may provide support for a BAS hyper-sensitivity theory of BD and SUD.

Another explanation for the high co-occurrence of BD and SUD suggests that substance use may cause symptoms which mirror affective symptoms (Goodwin & Jamison, 1990) or, that in certain vulnerable individuals; substances may cause a mood disorder to develop. Analysis of the self reported after-effects of substance use in this study may warrant further investigation, as a number of participants reported the direct effects of substance use to include feelings such as depression, racing thoughts, irritability, worthlessness and anxiety. Although all participants in this study met DSM criteria for BD, it is possible that for some, after-effects of substance use may mirror the symptoms of their illness, suggesting a close relationship between effects of substances and symptoms of BD; a possible explanation for the increased rate of relapse reported (Hoblyn et al., 2009) for individuals with BD and SUD.

Results from this cross sectional study of self reported reasons for use suggest that a subset of individuals studied report their substance use in relation to mood management and another subset report substance use predominantly for social reasons. These findings are consistent with conclusions presented by Strakowski and Dellbello (2000) that one theory of the co-occurrence of these two disorders will fail to offer full explanation for all cases. Should future research find similar patterns in the self reported reasons for use endorsed by this clinical group, a stronger case for self medication of symptoms may be appropriate to explain high levels of use in a subgroup of people with a BD diagnosis, while other explanations may be more appropriate for those who use substances socially. This research highlights the need for further investigation in this area.

4.6 Strengths and limitations

4.6.1 Design

A strength of this study was the use of Q methodology as a means of sorting experiences of substance use. Not only does this method provide a systematic means to examine and understand experience, it allows for the consideration of many possible experiences before asking participants to sort them according to their preference. Where previous reasons for use studies with individuals with BD have potentially limited responses due to asking participants to report their main reasons for use (Warner et al., 1994); providing a list of reasons to select from (e.g. Bizzarri et al, 2007a; 2009; 2007b; Morriss et al, in prep; Weiss et al, 2004) or asking specific direct questions about reasons for use (Bolton et al, 2009; Sonne et al, 1994), this study provided a wide range of reasons and after-effects for participants to consider.

Although a variety of sources were accessed to generate the Q sets (literature, therapy tapes, transcripts), it is possible that there were some reasons and after-effects which were not

represented in the final lists, especially considering the initial search of the literature was not directly concerned with 'after-effects' or consequences. However, following each Q sort procedure, participants were asked if they felt that they experienced any reasons/ after-effects which were not represented in the Q set provided. Only one reason was suggested by a number of sorters and this was cannabis use to help them to connect with music, which had been condensed in the consultation process into 'increases my creativity'. No further after-effects were suggested. Overall, participants gave positive feedback regarding the sorting process.

The decision to ask participants to sort two sets of experiences, reasons and after-effects was based upon the mixture of concepts represented in reasons for use literature. Effectively, the reasons sort covered the endorsement of immediate experiences/ reasons/ expectancies of use since it was found that the term 'reason' was used to cover all these concepts in the literature. The introduction of the 'after-effects' sort was based on the temporal distinction between immediate experiences (reasons) and delayed experiences (after-effects) and included positive and negative after-effects. These concepts are closely entwined and although the condition of instruction for the two Q sorts was explicit, it is possible that this distinction was abstract to some participants. Specifically for after-effects, it is possible that individuals found the process of distinguishing immediate after-effects (direct effects of substances) from delayed after-effects (in the 24 hours following substance use) challenging or abstract. However, research investigating links between cannabis use and schizotypy (Barkus et al, 2008) has successfully demonstrated the relevance and applicability of separating immediate experiences from after-effects, reporting the development of the CEQ which measures positive immediate effects; psychosis-like immediate effects and after-effects on three subscales.

As earlier noted, during the development of the Q concourse, the decision was made to exclude those reasons for substance use related to external factors such as 'because it's cheap' in favour of internal factors, so as to understand experiences specifically in relation to mood rather than finance or availability. However, it is possible that the removal of some such factors (for example, 'to relieve pain') may have prevented participants from providing a thorough representation of their experiences, as this statement could have been interpreted as either internal or external. Although the relief of psychological pain was not offered as an additional reason for substance use by any participants who completed the sorts, future research should provide an opportunity for the investigation of such a factor.

The study relied solely on self reported amount, pattern and experience of substance use. These self reports were not verified by collateral information by care teams, case notes, relative reports or by biological samples. Although the research team were separate from care teams, and participants were made aware that all substance related information would be treated confidentially, it is possible that due to generally negative views regarding substance use likely held by clinical teams and society, that participants provided inaccurate estimates of use. Future

research should strive to collect collateral reports and biological estimates of substance use to test the accuracy of substance use reports.

This study also relied on the self reported reasons and after-effects of substance use, and several limitations related to this method much be noted. Retrospective self reported experiences of substance use may be subject to recall bias due to varying lengths of time between substance use and completion of the Q sorts. However, eligibility criteria ensured that all participants were currently using alcohol or cannabis to a set level.

As assessed by the SCID, no participant who took part in the study was experiencing current depression, mania or hypomania. Given that several participants provided feedback that they would have sorted the statements differently depending on what mood state they were experiencing (for example, when they feel high they may use substance for different reasons; with different after-effects to when they feel low) responses may have been subject to recall bias. Participants were asked to sort the statements according to their current mood in order to provide comparison across the whole sample, but it is worth considering that emerging factors may have been quite different should participants have been experiencing current symptoms.

Furthermore, self reported reasons and after-effects may be appraisals or post hoc rationalisations, questioning the ability to generalise findings of this study. However, the majority of scales developed to investigate reasons and effects of substance use in clinical and non-clinical samples have been developed based on self report, which remains a central aspect of clinical practice also (Green et al., 2004).

A general limitation of this study is its cross sectional nature. Specifically for stage 2 of data analysis, causal effect cannot be established where differences between individuals' substance use experiences were identified.

4.6.2 Measures

A strength of the study was that BD diagnosis was confirmed using the SCID (First et al., 1997), a semi-structured diagnostic interview that covers all Axis I diagnoses. This interview allowed for the research diagnosis of any co-morbid Axis I disorders including alcohol or substance abuse or dependence. This interview is widely used in clinical research, and so allows comparisons to be made across clinical and research settings.

The drug use scale of the Opiate Treatment Index (OTI; Darke et al., 1991) was administered to provide details regarding current substance use including a score of average daily consumption. Although the average daily consumption score was a useful measure of amount of use for each substance independently (units of alcohol, occasions of cannabis use), clearly the difference in units of use recorded made comparison across the whole sample difficult. Though research in the general population suggests that heavier use is associated with coping related reasons for substance use, this was difficult to test within the whole sample for this study, due to participants reporting their reasons for, and after-effects of using either alcohol or cannabis.

SCID substance use diagnosis, number of days use in the past month and period of use at current level showed no direct associations with reasons for use in this study and future research should endeavour to utilise an overall substance use rating which may provide different findings.

Unfortunately, due to the length of time the assessment measures took to administer, and to avoid overburdening participants, observer-rated mood symptom measures were conducted in separate appointments to the Q sort procedures, meaning that direct association between observer-rated mood ratings and Q sort results should be made with caution. It is possible, due to the fluctuating nature of BD, that a participant may report low mood in one appointment which could be subject to change one week following this. For this reason, where analysis identified differences in score on the Mania Rating Scale across factors, further exploration is necessary before conclusions can be drawn.

Self report measures of mania and depression, conducted on same day as the Q sort procedure revealed no significant findings regarding self reported mood and substance use experiences. The benefits of employing self report measures as well as observer rated measures of mood include the opportunity they provide for participants to give a direct view of their mood in a quick and simple way on the day that the study took place.

4.6.3 Participants

A number of factors limit the generalisabilty of the findings from this study. Firstly, the sample was predominantly recruited from secondary care services and voluntary care services, meaning that it is possible that the results show a bias towards participants who are keen to engage with services and research and who may have a greater acceptance of the detrimental effects that substance use has on mental health. Efforts were made to represent individuals who engage less with community services by allowing participants to self refer in an attempt to reduce this selection bias. This resulted in a total of 16 self referrals of whom 12 went on to complete the study, however it is still not possible to generalise results to all individuals as those who believe they experience no negative outcomes related to substance use may be less likely to get involved with such research.

Secondly, not all participants who took part in the study met criteria for a SUD. Although all participants met eligibility for the study in terms of amount of substance, only 76% met criteria for current substance abuse or dependence disorder, reducing the generalisability of results directly to those individuals with co-occurring BD and SUD. However, in order to meet criteria for SUD according to the SCID, participants must self report the detrimental impact substance use has on their lives, so it is possible that heavy substance users who are unaware or simply deny the negative impact that substance use has on their mental health would also fail to meet criteria according to the SCID.

Furthermore, eligibility criteria determined that only participants with BD I and II took part in the study, so findings do not generalise to individuals with atypical BD (BD NOS). The sample was

predominantly white and British and so care should be taken when considering implications of these results to other populations where substance use has very different cultural or religious implications.

Finally, there is evidence that individuals with BD most commonly use alcohol and cannabis (Regier et al., 1990; Chengappa et al., 2000) so the decision was made for this study to recruit only those individuals whose primary substance was one of these two. It is not possible therefore to generalise these results to those who report other substances as their primary substance of use.

Unfortunately, no control group was used in this study to provide comparison with other groups such as those in the general population who use cannabis and alcohol regularly, or those with other psychiatric disorders such as psychosis or major depression. A control group would help to determine whether reasons for substance use are specific to the group of individuals with BD, or comparable with other clinical and non-clinical groups.

A Q methodological study requires a relatively small number of participants in order to produce meaningful results, however when groups were broken down for analysis into the alcohol and cannabis subgroups, results should be considered exploratory as factors in the subgroup analyses were sometimes made up of as few as two participants. Furthermore, chi square tests require large samples in order to make inferences to a wider population (Field, 2005) and, although Fisher's test of significance (Fisher, 1992) is reported where expected counts were less than five, the analyses run on the subgroups have low statistical power.

It should be further noted that due to the design of this study, the multiple testing employed increases the possibility of a type I error occurring, and raises questions relating to the generalisability of the results where differences between the ways in which participants sorted reasons and after-effects were detected. Several variables within stage 2 of data analysis (including demographic, clinical and substance use) were applied to test differences between Q sort factors. As the number of comparisons increases, so too does the likelihood that differences will be detected. Future research should generate specific hypothesis relating to the nature of differences in substance use patterns, possibly based on the preliminary findings in this study and others, to reduce problems associated with multiple testing.

Finally, those participants who came into the study with reported levels of both alcohol and cannabis use meeting eligibility criteria were asked to self report their MPS and conduct the study in relation to that substance. For those participants, it was impossible to control for the effects of the second substance on their responses to the Q sort. Moreover, four participants met SCID criteria for abuse or dependence of another substance, therefore differences detected in reasons for use relating to substance type should be further tested in participants who report use of only one specific substance in order to generalise results specially to the use of that substance.

4.7 Clinical Implications

Much research has supported a link between co-occurring BD and SUD, and negative outcomes. For this reason, treating substance use in individuals with BD remains a key area for treatment development; few studies have tested treatments specifically designed for this clinical group, and those that have been conducted have provided mixed results (Schmitz et al., 2002; Weiss & Griffin, 2009; Weiss et al., 2000; 2007). The results of the current study are consistent with previous research which suggests that participants' reasons for substance use are idiosyncratic (Healey et al., 2009), but further suggest that there may be two distinct groups of individuals with BD who use substances: those who drink or use cannabis to manage their mood, and those who use substances socially. This understanding would be key in directing treatment development, as an understanding of what motivates substance use may direct CBT interventions to specific areas. For example, those individuals who endorse mood management related reasons may benefit from interventions which provide new ways of coping with mood fluctuation; while those who predominantly use substances socially may benefit from psycho-social interventions focussed on lifestyle and routine, or confidence and self esteem. Moreover, results of this study are consistent with previous reports (Grinspoon & Bakalar, 1998) that there may be a tendency for those who use cannabis to manage high mood with substance use, which if replicated in larger samples may specifically direct cannabis interventions. These results highlight the potential relevance of distinguishing between substances of use in planning appropriate psychological treatment.

Analysis of the after-effects of substance use suggests that some individuals perceive substance use to have positive consequences. These findings suggest that successful approaches to treatment should not only be centred to the exact experiences of an individual, but also must avoid making assumptions about the effects of a substance, based on the common effects reported by others.

The Q sort procedure itself was a useful way not only of providing information for analysis but for helping participants to understand more about their reasons and after-effects of substance use. Based on such positive feedback relating to the method, it is possible that a similar process could be used in a therapeutic environment to enable individuals to consider why they use substances, and what the after-effects of that use are. One participant reported that the after-effects of alcohol use seem to be "all of the opposites to the reasons why I drink", something which without systematic sorting of statements may not have been so clear.

4.8 Suggestions for further research

Although informal feedback from participants about the Q sort procedure was positive, the process of performing two sorts was relatively time consuming therefore the sample size for this

study was small. One subsequent possibility for future research might be to use the results from the current study to develop a scale of reasons for, and after-effects of substance use in BD and to carry out a quantitative study validating this measure in a large sample of participants with BD. The benefits of a quantitative method for measuring experiences include ease of completion, speed of administration and the opportunity to collect data on larger samples across different time points.

As previously noted, participants who completed this study were assessed not to be currently experiencing clinical episodes of depression or mania. However, if it is the case that a subgroup of individuals with BD and SUD use substances to manage symptoms such as irritability, racing thoughts and low mood, as is suggested the self medication theory, it would be important to explore whether reasons for substance use change during phases of illness. Furthermore, to provide evidence for such a theory, research would need to find direct links between amount of use and severity of illness. In this study an overall measure of substance use was not possible due to participants sorting reasons and after-effects according to their MPS: cannabis or alcohol. In future research, larger subgroups of substance users could provide further clarification. By exploring the substance use experiences of individuals in this heterogeneous group, it may be possible to tailor psychological treatments more effectively.

To overcome the limitations discussed regarding self report data, a method of investigation which asks participants to report their experiences with substance use throughout the day in everyday life may provide a clearer understanding of substance use. Experience Sampling Method (ESM, De Vries, 1992; Delespaul, 1995) is a structured diary method asking participants to record their thoughts and feelings at random time points throughout their normal daily life. As earlier noted, researchers within the PARADES programme (Tyler, Barrowclough, Jones, Black & Carter, 2011, in prep) recently employed this methodology in a group of participants with BD and current cannabis use. This method may serve to reduce the potential for recall bias and biased appraisals, and could be used to test substance use experiences in relation to self medication while avoiding the disadvantages discussed related to self report data.

This study raised the question of whether individuals who predominantly use cannabis are more likely to be using substances to manage their mood than those who predominantly use alcohol. Future research should seek to explore this finding in a larger sample, as it may have important implications for cannabis use treatment for individuals with a diagnosis of BD.

4.9 Conclusion

In conclusion, participants with BD in this study reported distinct idiosyncratic patterns of reasons for substance use relating either to the management of mood or to social motivations. Reasons were found to some extent to be distinguished by participants' most problematic

substance, as cannabis users appeared to report reasons for use more commonly related to the management of high mood such as managing racing thoughts and restlessness. The alcohol subgroup in this study reported more socially driven motivations for use, such as feeling more likeable and confident. Level of substance use did not appear to predict reasons for use though sample size was small and warrants further investigation.

After-effects were either predominantly positive or negative suggesting that some individuals in this study report that the use of substances has little impact on their mental health other than the immediate benefits of intoxication, while others recognise many negative consequences of alcohol or cannabis use. A third group of individuals in this study reported after-effects synonymous with feeling high. That there are subgroups of substance users who report such polar experiences has clear implications for psychological interventions which target substance use in this clinical group.

These findings further suggest that the experiences of substance use for individuals with a diagnosis of BD are idiosyncratic, and likely developed through direct personal experience. Future research should seek to explore the patterns identified in the current study, which if replicated, would provide evidence to suggest that one explanation for the high number of individuals with BD using substances may be due to their perceived self medication effects. Research within, and beyond the reasons for use field should consider exploration of experiences, including after-effects and consequences of use, in order to fully understand what other factors may contribute to high levels of co-morbidity of SUD in BD.

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Appendices

Appendix 1: DSM-IV Diagnostic criteria for mania, hypomania, major depressive episode, substance abuse disorder and substance dependence disorder

Table 1.1 DSM-IV Diagnostic criteria for **mania**

A distinct period of abnormally and persistently elevated, expansive, or irritable mood (lasting at least 1 week or any duration if hospitalization is necessary).

Plus at least 4 of the following symptoms:

1. Inflated self-esteem or Grandiosity;
2. Decreased need for sleep (e.g., feels rested after only 3 hours of sleep);
3. More talkative than usual or pressure to keep talking; flight of ideas or subjective experience that thoughts are racing;
4. Distractibility (i.e., attention too easily drawn to unimportant or irrelevant external stimuli);
5. Increase in goal-directed activity (either socially, at work or school, or sexually) or psychomotor agitation;
6. Excessive involvement in pleasurable activities which have a high potential for painful consequences (e.g., engaging in unrestrained buying sprees, sexual indiscretions, or foolish business investments)

mood disturbance is sufficiently severe to cause marked impairment in occupational functioning or in usual social activities or relationships with others, or to necessitate hospitalization to prevent harm to self or others, or there are psychotic features.

American Psychiatric Association, 2000

Table 1.2: DSM-IV Diagnostic criteria for **hypomania**

"A distinct period of persistently elevated, expansive or irritable mood, lasting throughout at least 4 days, that is clearly different from the usual nondepressed mood."

Plus at least 3 of the following (4 if mood only irritable):

1. Inflated self-esteem or Grandiosity;
2. Decreased need for sleep (e.g., feels rested after only 3 hours of sleep);
3. More talkative than usual or pressure to keep talking;
4. Flight of ideas or subjective experience that thoughts are racing;
5. Distractibility (i.e., attention too easily drawn to unimportant or irrelevant external stimuli);
6. Increase in goal-directed activity (either socially, at work or school, or sexually) or psychomotor agitation;
7. Excessive involvement in pleasurable activities which have a high potential for painful consequences (e.g., engaging in unrestrained buying sprees, sexual indiscretions, or foolish business investments)"

The episode is associated with an unequivocal change in functioning that is uncharacteristic of the person when not symptomatic and the disturbance in mood and the change in functioning are observable by others.

American Psychiatric Association, 2000

Table 1.3: DSM-IV Diagnostic criteria for a **major depressive episode**

"A persistent 2 week period of either depressed mood most of the day, nearly every day, as indicated either by subjective report (e.g., feels sad or empty) or observation made by others (e.g., appears tearful) or markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated either by subjective account or observation made by others)"

Plus at least 5 of the following symptoms:

1. significant weight loss when not dieting, or weight gain (e.g., a change of more than 5% of body weight in a month) or decrease or increase in appetite nearly every day;
2. insomnia or hypersomnia nearly every day;
3. psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down);
4. fatigue or loss of energy nearly every day;
5. feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick) diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others)
6. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide."

"The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning."

American Psychiatric Association, 2000

Table 1.4: DSM-IV Diagnostic criteria for **substance abuse disorder**

A maladaptive pattern of substance use is reported or evident but not to the point at which the individual depends upon the substance psychologically or physically.

As indicated by 1 or more of the following:

- recurrent alcohol use resulting in a failure to fulfil major role obligations at work, school, or home (e.g., repeated absences or poor work performance related to alcohol use; alcohol-related absences, suspensions, or expulsions from school; neglect of children or household
- recurrent alcohol use in situations in which it is physically hazardous (e.g., driving an automobile or operating a machine when impaired by alcohol use)
- recurrent alcohol-related legal problems (e.g., arrests for alcohol-related disorderly conduct), or
- continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance (e.g., arguments with spouse about consequences of intoxication, physical fights)

American Psychiatric Association, 2000

Table 1.5: DSM-IV Diagnostic criteria for **substance dependence disorder**

A maladaptive pattern of alcohol use, leading to clinically significant impairment or distress, as manifested by three (or more) of the following occurring at any time in the same 12-month period:"

1. alcohol is often taken in larger amounts OR over a longer period than was intended
2. there is a persistent desire OR unsuccessful efforts to cut down or control alcohol use
3. a great deal of time is spent in activities necessary to obtain alcohol, use alcohol, or recover from its effects
4. important social, occupational, or recreational activities given up or reduced because of alcohol use
5. alcohol use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol (e.g., continued drinking despite recognition that an ulcer was made worse by alcohol consumption)
6. tolerance, as defined by either of the following: (a) a need for markedly increased amounts of alcohol to achieve intoxication or desired effect or (b) markedly diminished effect with continued use of the same amount of alcohol
7. withdrawal, as manifested by either (a) or (b): (a) at least TWO of the following: autonomic hyperactivity (e.g., sweating or pulse rate greater than 100); increased hand tremor; insomnia; nausea or vomiting; psychomotor agitation; anxiety; grand mal seizures; transient visual, tactile, or auditory hallucinations or illusions or (b) alcohol (or a substance from the sedative/hypnotic /anxiolytic class) taken to relieve

or avoid withdrawal symptoms. *These symptoms must have occurred within the same 12 month period.*

American Psychiatric Association, 2000

Appendix 2: Participant Information Sheet

Experiences of Substance Use in Bipolar Disorder

Participant Information Sheet

Bipolar Disorder and Substance Use: Service User Experiences

We would like to invite you to take part in a service user defined research study. Before you decide whether you would like to take part, it is important that you understand why this research is being done and what it will involve. Please take the time to read the following information carefully and discuss it with others if you wish. Please ask us if there is anything that is unclear or that you would like more information about. Take time to decide whether or not you wish to take part.

What is the research project about?

This research aims to find out more about peoples' experiences of substance use in bipolar disorder, what positive and negative effects substances may have on the course of the illness and if and how substance use is related to Bipolar symptoms.

Who is organising the research?

This project is being organised by a team of researchers, academics and health professionals from Manchester Mental Health and Social Care Trust, the Universities of Manchester and Lancaster and a Service User Reference Group comprising of service users from across the North West.

This part of the research programme involves 2 parts. The first will look for any themes or patterns in substance use in Bipolar Disorder based on the prior knowledge that different people use substances for different reasons. The second will focus specifically on Cannabis use in Bipolar Disorder and will ask that participants wear a watch for 6 days which will beep at random times throughout the day to prompt completion of a brief diary.

Who will be taking part?

Part 1 will recruit up to 40 participants with Bipolar Disorder who regularly use alcohol and/or cannabis.

Part 2 will recruit up to 40 participants with Bipolar Disorder who regularly use Cannabis.

The study criteria for alcohol use is: anything above the guidelines for safe alcohol consumption limits (28 units per week for males/21 units per week for females) on at least half of the weeks of the previous 3 months

The criteria for cannabis use is: use at least two times per week in at least half the weeks in the 3 months prior to assessment.

Participants will be recruited from Greater Manchester and surrounding areas. Participants' minimum age will be 18.

Why have I been asked to take part?

Sharing your experiences with us will help to increase our understanding of substance use in bipolar disorder. We think that you could make a valuable contribution to this research project

Do I have to take part?

It is completely up to you to decide whether or not you would like to take part. If you do decide to take part you will be given a copy of this information sheet and be asked to sign a consent form. If you do decide to take part but change your mind later you are free to withdraw at any time and do not need to give us a reason. If you do decide not to take part, or to withdraw at any time, we will not use any of the data we may already have collected from you. Decision to withdraw will not affect the standard of care you receive.

What will taking part involve for me?

If you do decide to take part, a research assistant will arrange a time to come and meet you, either at home or at another place where you feel comfortable. We will ask you some questions first about your mood and substance use, just to confirm that you meet the criteria for one or both parts of the study. We will also take some details about prescribed medications you currently take. These questions will take 60-90 minutes.

If you meet criteria, you can choose to participate in part 1, part 2 or both parts.

We will then arrange another appointment to conduct the study.

Part 1: is called Q methodology. Q methodology involves sorting through a deck of cards which all have individual statements written on them and placing the cards in your chosen order onto a response grid which identifies which of the statements apply to you and which do not apply to you. The order in which you have placed the cards will be recorded and later compared with other peoples answers to investigate whether any themes or patterns emerge. There are 2 separate decks of cards to sort through – the first will describe immediate experiences of substance use in bipolar disorder and the second will describe delayed experiences of substance use in bipolar disorder. We will ask you to complete both card sorts. This appointment will take 60 – 90 minutes.

Part 2: Uses a method called Experience Sampling. This is a structured diary method where you will wear a watch for 6 days which beeps randomly at 10 different times throughout the day. Immediately following the beep you will be asked to fill out a booklet containing questions on your current situation, mood, bipolar symptoms and cannabis use. You can continue with your usual routine whilst wearing the watch.

Appointments will be audio taped. This is so that researchers can reflect on what is discussed and accurately record any extra details you provide.

Is the study confidential?

All the information that you give will be strictly confidential. Any data taken from you during the study will be held by the immediate research team.

Data and material may be looked at by relevant individuals from the University of Manchester, regulatory authorities or the NHS Trust, for monitoring and auditing purposes. In these situations, strict confidentiality will be maintained.

The information (data) collected will be anonymised, any tapes will be destroyed at the end of the study and any direct quotes used in the write up of the study will be done so in such a way as not to identify individuals.
If at any point during your involvement with the study, the research team are concerned for you in any way, they may wish to contact someone involved in your care. If this is the case, they will speak to you about it first and explain what they plan to do.

What are the advantages and disadvantages of taking part?

Both studies will give you a chance to reflect on your experiences of substance use in bipolar disorder. We hope that your experiences will help to inform the development of an intervention specifically for people who use substances in bipolar disorder, which will hopefully influence the practice of mental health professionals in delivering treatment and interventions to yourself and other service users.
Participants who meet criteria and complete study 2 will receive £10 towards expenses. This will be given at the end of the 6 day period, once booklets are completed and watches are returned.
It is possible that talking about your personal experiences may result in some distress. The people interviewing you will be sensitive to this. You will have the opportunity to discuss any concerns at the end of the interview and you are free to withdraw from the process at any point. We will check if there are any concerns you wish to raise and, if necessary, you will be able to talk to one of the clinical psychologists on the research team.

What do I do if something goes wrong?

If you are harmed by taking part in this research project, there are no special compensation arrangements. If you are harmed due to someone's negligence, then you may have grounds for legal action but you may have to pay for it. Regardless of this, if you wish to complain, or have any concerns about any aspect of the way you have been approached or treated during the course of this study, then in the first instance please contact:

Professor Christine Barrowclough, Professor of Clinical Psychology, The University of Manchester, Manchester, M13 9PL
Telephone: 0161 2758485 Email:
Christine.Barrowclough@manchester.ac.uk or
Professor Steven Jones, Professor of Psychology and Clinical Psychologist, Spectrum Centre for Mental Health Research, Lancaster University, Lancaster, LA1 4WY.
Telephone: 01524 593756 Email: s.jones7@lancaster.ac.uk

What will happen to the results of the research?

If you participate in either of the above studies you will be informed of the results. The findings will also be presented to a range of mental health professionals and service users with the aim of increasing the understanding substance use in bipolar disorder. It is hoped that the findings will also help to improve services and validate the experiences of other service users. The

findings will be published in mental health journals and other publications with the aim of reaching a range of mental health professionals and service users.
The findings will be used to inform subsequent phases of the PARADES programme: a treatment development phase involving consultation with service users and health professionals to develop an intervention for substance use in bipolar disorder. What we learn from these studies will be key in helping us to do this.
If you want any further information or have any questions, please contact the research assistants on this project:

Nancy Black – Research Assistant
nancy.black@nhs.net or

Lizzie Tyler – Trainee Clinical Psychologist
Elizabeth.Tyler@postgrad.manchester.ac.uk

Telephone: 0161 275 8498
/07553 388373

Appendix 3: Referrer Information Sheet

Experiences of Substance Use in Bipolar Disorder

Bipolar Disorder and Substance Use: Service User Experiences

Referrer Information Sheet

Who we are

We are a team of researchers based in the North West. The Primary Investigator of the PARADES programme is Professor Steven Jones based at the Spectrum Centre for Mental Health Research at Lancaster University and the Chief Investigator for the Substance Misuse in Bipolar Disorder stream is Professor Christine Barrowclough based at the University of Manchester. Dr Lisa Riste is the Programme Manager, and there are two researchers working on this study: Nancy Black (Research Assistant) and Lizzie Tyler (Trainee Clinical Psychologist). They will be assisted with recruitment by members of the Mental Health Research Network team.

Study aims

This study endeavours to understand more about the experiences of Substance Use for patients with Bipolar Disorder. This phase of the project will have 2 parts:

Part 1 employs Q methodology which involves participants sorting through a deck of cards which have individual statements written on them and placing the cards in their chosen order onto a response grid which identifies on a continuum which of the statements apply to them and which do not. The order in which the cards are placed will be recorded and later compared with other people's answers to investigate whether any themes or patterns emerge. There are 2 separate decks of cards to sort through – the first will describe immediate experiences of substance use in Bipolar Disorder and the second will describe delayed experiences of substance use in bipolar disorder. We will ask participants to complete both card sorts.

Part 2 uses a method called Experience Sampling. This is a structured diary method where participants will wear a watch for 6 days which will beep 10 times throughout the day. Immediately following the beep participants will be asked to fill out a booklet containing questions about their current situation, mood, bipolar symptoms and cannabis use.

Participants who use cannabis regularly will have the option of being involved in both parts, but they can decide to take part in only 1 if they wish.

Those who use alcohol will be suitable for part 1.

The results of both studies will then be used to inform subsequent phases of the project, a treatment development phase which will involve consultation with service users and health professionals to develop an intervention specifically for substance use in bipolar disorder. This will then be trialled in Phase 3 of the project with participants who experience substance use in bipolar disorder and we will measure this in terms of effectiveness and feasibility. We will be recruiting for phases 2 and 3 at a later date.

Rationale

There is a high level of substance use (SU) in individuals with Bipolar Disorder (BD). Some studies have reported levels up to 60%; this level is higher than any other Axis 1 psychiatric disorder. Many studies have shown that outcomes of having both disorders concurrently can be far worse than managing one of these disorders alone, for example with higher levels of treatment non-compliance, higher rates of suicide and increased periods of depression.

Despite the growing concern for patients living with dual diagnosis, there has been very little research into specific treatments for this co-morbidity. Some trials testing psychological treatments for BD and SUD have shown some improvements in Substance Use but not necessarily in symptoms of BD. Research to date suggests that people with Bipolar Disorder use substances for different reasons – some give the same reasons as people without a co-morbid mental health problem; but some suggest that they use symptoms to help treat BD.

The planned studies aim to explore the relationships between Bipolar Disorder and Substance use more closely, asking participants with both diagnoses how it really is for them.

Start date

We will be recruiting from March 2010. Recruitment will continue through until July 2011.

Criteria

We are looking for approx 40 people to take part in each study. Participants will meet the following criteria:

Study 1:

- Have a diagnosis of Bipolar disorder I or II
- Age 18+
- Alcohol use per week exceeding **28 units** for males/ **21 units** for females
- **OR** use of Cannabis at least **two times** per week

Study 2:

- Have a diagnosis of Bipolar disorder I or II
- Age 18+
- Use of Cannabis at least **two times** per week

Get involved!

We would like you to consider anyone you are currently working with who may have bipolar disorder and regularly use cannabis or alcohol, and tell them about the research. Then if they are interested, ask them if it would be ok for one of us to contact them with more information. We will provide extra details and answer any questions people may have. If they wish to take part, we will gain their written consent. This is an exciting time for service users to get involved in research into their own health problems and to be involved in change and development.

Any questions, queries or referrals, please contact us any time on:

Nancy Black (nancy.black@nhs.net) or
Lizzie Tyler (Elizabeth.tyler@postgrad.manchester.ac.uk)
Or Telephone: 0161 275 8498
Mobile: 07553 388 373

Appendix 4: Study poster

PARADES

Do you have Bipolar Disorder?

Do you regularly use Alcohol or Cannabis?

Would you like the opportunity to take part in research designed to improve understanding of substance use in Bipolar Disorder?

If the answer to these questions is 'yes' then we'd love to hear from you.

We are a team of researchers from the North West and local NHS trusts. We are conducting 2 related studies to learn more about the experience of Substance Use in Bipolar Disorder and if or how this affects you…

We plan to use what you tell us to help develop an intervention for substance use in bipolar disorder

For more information or to apply to join the study please contact:

Nancy Black or Lizzie Tyler
Tel: 0161 275 8498
Mob: 07553 388 373
Email: nancy.black@nhs.net **or**
Elizabeth.Tyler@postgrad.manchester.ac.uk
Spectrum Centre for Mental Health Research
www.lancs.ac.uk/shm/spectrum/parades/

Version 1.0

1 Dec 2009

NHS
National Institute for Health Research

Appendix 5: Letter to participant (Spectrum participant panel)

Nancy Black/ Lizzie Tyler,
Research Team (PARADES)
Room S28, 2nd Floor,
Zochonis Building
University of Manchester
Brunswick Street
Manchester
M13 9PL

0161 275 8498
07553 388 373
Email: nancy.black@nhs.net

Date: 2 July 2010

Dear

We're writing to you because you recently gave permission to a member of the PARADES research team to contact you if there was any upcoming research which you might be able to get involved with.

We are now running a study which aims to find out more about the experiences of alcohol and cannabis use in Bipolar Disorder.

With this letter I have enclosed a Participant Information Sheet which tells you more about what would be involved if you decided to take part in the research.

If you're interested to find out more or get involved please contact us on the numbers provided.

If you have any questions before then or would prefer we didn't contact you, please get in touch with the research team – Nancy Black or Lizzie Tyler on any of the contacts above.

Thanks for your interest in the study,

Best Wishes

Nancy Black and Lizzie Tyler
Research Assistants

Appendix 6: Risk assessment for home visit

RISK ASSESSMENT FORM (PARADES Substance Use Stream)

Participant number:	
Participant Initial:	
Date of birth:	
Service name:	
Care co-ordinator name:	
Date completed:	

Self-Neglect
Environmental Risk
Relapse Risk
Self-Harm
Harm to Others
General Information

Appendix 7: Research Ethics approval letter

NHS

National Research Ethics Service

[redacted] Research Ethics Committee [redacted]

[redacted]

Telephone: [redacted]
Facsimile: [redacted]

09 March 2010

Prof Christine Barrowclough
Room S28
2nd Floor Zochonis Building
Brunswick Street
The University of Manchester
M13 9PL

Dear Prof Barrowclough

Study Title:	**Investigating co-morbid Bipolar Disorder and Substance Use: Service User Experiences.**
REC reference number:	**10/H1002/12**
Protocol number:	**2.0**

Thank you for your letter of 04 March 2010, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

For NHS research sites only, management permission for research ("R&D approval") should be obtained from the relevant care organisation(s) in accordance with NHS research governance arrangements. Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk.

Where the only involvement of the NHS organisation is as a Participant Identification Centre, management permission for research is not required but the R&D office should be notified of the study. Guidance should be sought from the R&D office where necessary.

Sponsors are not required to notify the Committee of approvals from host organisations.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	*Version*	*Date*
Covering Letter		28 January 2010
REC application	1.0	28 January 2010
Protocol	2.0	04 March 2010
Investigator CV		28 January 2010
Participant Information Sheet	2.0	04 March 2010
Participant Consent Form: Part 1	2.0	04 March 2010
Participant Consent Form: Part 2	2.0	04 March 2010
Participant Consent Form: Consent for storage of contact detail for future research	1.0	04 January 2010
Letter of invitation to participant	1.0 - *2	15 January 2010
GP/Consultant Information Sheets	1.0	01 December 2009
Letter from Sponsor		27 January 2010
Letter from Statistician		08 December 2009
Referees or other scientific critique report		01 January 2010
Questionnaire: Validated Questionnaire - Adapted SCID		01 January 2010
Questionnaire: Validated Questionnaire - PHQ-9		01 January 2010
Questionnaire: Validated Questionnaire - Internal State Scale		01 January 2010
Questionnaire: Validated Questionnaire - BIS/BAS Scale		01 January 2010
Questionnaire: Non-Validated Questionnaire - Sociodemographic Information	1.0	07 December 2009
Advertisement	1.0	01 December 2009
Letter from Funder		01 January 2010
Instructions for Part 1		01 December 2009
Q Study Items (part 1)	1.0	01 December 2009
ESM Booklet (part 2)		01 December 2009
ESM Booklet (part 2)		01 December 2009
Questionnaire: Non-Validated Questionnaire - Pre Screen	1.0	01 December 2009
Summary CV for Researcher NB		28 January 2010
Summary CV for Researcher ET		28 January 2010
Response to Request for Further Information		04 March 2010
Referrer Information Sheet	2.0	05 March 2010

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating

Procedures for Research Ethics Committees in the UK.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Service website > After Review

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nres.npsa.nhs.uk.

10/H1002/12	**Please quote this number on all correspondence**

Yours sincerely

[redacted]

Email: [redacted]

Enclosures: "After ethical review – guidance for researchers" *[SL-AR1 for CTIMPs, SL- AR2 for other studies]*

Copy to: *R Hopkins, R&D, MMHSC NHS Trust*
Karen Shaw, University of Manchester
Nancy Black, University of Manchester

Appendix 8: Example Research and Development Letter

MANCHESTER CITY COUNCIL

Manchester Mental Health and Social Care Trust NHS

Submission Point for Electronic Approval of Research

Research & Development Office
Manchester Mental Health & Social Care Trust
Room N3 FC027
3rd Floor
Rawnsley Building
Manchester Royal Infirmary
Hathersage Road
Manchester
M13 9WL
t 0161 276 3311

22nd March 2010

Prof. Christine Barrowclough
Room S28
2nd Floor, Zochonis Bldng
Brunswick Street
University of Manchester
M13 9PL

Information for ID Badge if required:
Research Project Ref No: 0929
Expiry Date: 31/07/2011
You must take this letter with you.

Dear *Christine*,

Re: Research Governance Decision Letter

Project Reference: 0929 (CSP: 37662/GM)
Unique SPEAR Identifier: *0929*
Project Title : *Investigating co morbid Bipolar Disorder and Substance Use: Service User Experiences.*

Further to your request for research governance approval, we are pleased to inform you that this Trust has approved the study. Please note when contacting the R&D office about your study you must always provide the project reference numbers provided above.

Trust R&D approval covers all locations within the Trust, however, you should ensure you have liaised with and obtained the agreement of individual service/ward managers/medical records departments before commencing your research.

Please take the time to read the attached 'Information for Researchers – Conditions of Research Governance Approval' leaflet, which give the conditions that apply when research governance approval has been granted. Please contact the R&D Office should you require any further information. You may need this letter as proof of your approval.

Appendix 9: Participant consent sheet

CONSENT FORM – Part 1

Bipolar Disorder and Substance Use: Service User Experiences
Part 1 (Substance Use and Bipolar Disorder: A Q Methodological Study)
REC ref: _____

Name of Researcher: _____
Name of Participant: _____ **Please initial box**

Participant Number ☐☐☐☐

1. I confirm that I have read and understand the information sheet version number ……. dated …… for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and without my medical care or legal rights being affected. ☐

3. I give my consent for my appointments with the research team to be audio-taped so that the researchers can reflect on what was discussed and record accurately any extra information I provide. ☐

4. I understand that any data collected during the study may be looked at by individuals from regulatory authorities or from the NHS trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records and to collect, store, analyse and publish information obtained from my participation in this study. I understand that my personal details will be kept confidential. ☐

5. I agree to my GP (and care co-ordinator where appropriate) being informed of my participation in this study and being informed should the researchers have concerns about my mental health while I'm in the study. ☐

6. Please indicate if you would like to be informed of the results. ☐

7. I agree to take part in the above study. ☐

8. I give permission for my direct quotations to be recorded and used if required in published format, and understand that this information will be kept anonymous. ☐

9. I agree for my details to be available to other researchers within the PARADES Programme and for them to contact me should I be considered appropriate for related studies. ☐

_____	_____	_____
Name of Participant	**Date**	**Signature**
_____	_____	_____
Name of Person taking consent Date (If different from Principal Investigator)	Signature	
_____	_____	_____
Name of Principal Investigator	Date	Signature

3 copies: 1 for participant, 1 for the project notes and 1 for the medical notes

Appendix 10: Q concourse; final Q sets

Table 10.1: Q concourse: List of experiences generated from searches in the literature, transcripts and therapy tapes

Statement	Literature	Transcripts	Therapy tapes
To be part of a peer group	✓		
To self medicate	✓	✓✓✓	✓
To relieve anxiety	✓		
To relieve stress	✓	✓	✓
Addiction	✓		
To relieve depression	✓	✓	
~~Availability – its easy to get hold of~~	✓		
Boredom	✓	✓✓	✓✓
Cognitive enhancement	✓		
Cope with other negative mood	✓		
Entertainment	✓		
Habit	✓	✓✓✓	✓
Interaction with others	✓		
Mood alteration	✓		
Perceptual change	✓		
Physical enhancement	✓		
Preferred alternative	✓		
To manage psychotic symptoms	✓		
Relaxation	✓	✓✓	✓✓
Medication side effects	✓		
Social activity/offered	✓	✓	
Wanted to	✓		
Activity with friends	✓	✓✓	✓
Improve sleep	✓		✓
Improve self esteem	✓		
Feel more likeable	✓		
Feel better physically	✓		
~~Relieve pain~~	✓		
To feel Normal	✓	✓✓	
To increase energy	✓		
Stay awake	✓		
Decrease hallucinations	✓		
Wanted to fit in with peers	✓		
Family member/ caretaker used	✓		
Emotional/mental issues	✓		
Fun/ experiment/ curiosity	✓	✓✓	✓
Problems at home or school	✓		
Traumatic/ stressful event	✓		
Wanted to drink/use	✓		
Drug intoxication effects	✓		
Dysphoria relief	✓		
'Social'	✓	✓✓	✓
Illness/ medication	✓	✓✓	
Because it helps when your are feeling nervous	✓		✓
Because it helps when you are feeling depressed	✓		
To forget your worries	✓	✓	
To feel more motivated	✓		
To make it easier to sleep	✓		
To help me concentrate	✓	✓	
Because you feel more self-confident or sure of	✓		

yourself			
To decrease restlessness	✓		
To slow down racing thoughts	✓		✓
Enhancement	✓		
Because it makes you feel good	✓	✓✓	✓
Helps me remember things	✓		
Because it's what most of your friends do when you get together	✓		
Because its fun	✓		
To get high	✓	✓✓	
Because it makes a social gathering more enjoyable	✓	✓✓✓	✓
As a way to celebrate	✓		
To relax	✓	✓✓✓✓✓	✓
Conformity and acceptance	✓		
So you won't feel left out	✓		
To be liked	✓		
To help you talk to others	✓		
To be sociable	✓		
To be part of a group	✓		
Relief of positive symptoms and side effects	✓		
To get away from the voices	✓		
Because your friends pressure you to do it	✓		
To feel less suspicious/paranoid	✓		
Curiosity or experimentation	✓		
Social/environmental	✓	✓✓	
Peer pressure	✓	✓	
Wanting to belong	✓		
Norm of environment	✓		
Coping	✓		
Trauma	✓		
Symptom specific coping	✓		
Social reasons	✓		
Escape reasons	✓	✓✓	
Escape symptoms	✓		
Racing thoughts	✓		
Irritability	✓		
To achieve or maintain a state of mania	✓		
To control anger	✓	✓	
To increase creativity	✓		
To be more competitive	✓		
To control negative behaviours	✓		
To reduce the fear of passing out in public or important situations	✓		
To feel at ease in all social situations	✓		
To manage repetitive thoughts, urges or images that bother you	✓		
To feel more comfortable in all performance situations	✓		
To reach a new dimension	✓		
Substances improved overall functioning	✓		
Think about substances through the day	✓		
Think of substances as friends	✓		
Think that substances are an important part of life	✓		

Think that life is unbearable without substances	✓		
To improve mood	✓		
Relieve tension/anxiety	✓		
Sleep	✓	✓	✓✓
Be more self confident	✓	✓	
Tolerate sadness	✓		
Alleviate tiredness	✓		
Increase energy	✓		
Achieve/maintain euphoria	✓	✓	
Feel better after negative experience	✓		
~~Tolerate persistent pain or physical symptoms~~	✓		
Express bottled up anger	✓		
Control anger	✓		
Escape reality	✓		
Control obsessive symptoms	✓		
Control compulsive symptoms	✓		
Increase self confidence in talking with other people	✓		
Increase self confidence in sex	✓		
Feel at ease in romantic relationships	✓		
Be able to participate in social activities	✓		
Get over the fear of being judged by others	✓		
Avoid appearing nervous	✓		
Reach a new dimension	✓		
Sensation seeking	✓		
Follow instinct without thinking	✓		
~~Spend money impulsively (on drugs)~~	✓		
Deliberate attempts to treat depression	✓		
Deliberate attempts to treat mania	✓		
To deliberately boost mood while in mania	✓		
On impulse while in mania	✓	✓✓	
To escape mood	✓		
To escape problems	✓		
To increase self-confidence	✓	✓	✓
Because others were doing it	✓		
To help mood	✓		✓
To decrease manic symptoms	✓		
To attenuate manic and depressed symptoms	✓	✓✓	
Family problems	✓		
Job problems	✓		
When things are going well	✓		
Sleeping problems	✓		
~~Physical health problems~~	✓		
To become more sociable	✓	✓	
To reduce tension	✓		
Suspiciousness	✓		
To increase sexual desire	✓		
To reduce inhibitions	✓		
To celebrate success	✓		
To make yourself more attractive sexually to others	✓		
Wake you up	✓		
~~Menstrual problems~~	✓		
Friendliness	✓		
Self esteem	✓	✓	

Desire for sex	✓		
Ability to have sex	✓		
Appetite	✓		
Ability to concentrate	✓		
Reduces anger	✓		
Job performance	✓		
Family problems	✓		
Wakefulness	✓		
My sexual attraction to others	✓		
Mania	✓	✓✓	✓
Improved memory	✓		
Longer attention span	✓		
Feel less irritable	✓		
I feel I don't worry		✓	
When I've been manic		✓	
I experiment with everything when manic		✓	
To bring me down a bit		✓	
Loads of people were doing it		✓	
It was a chill out thing		✓	✓
If I'm high and manic		✓	✓
Because I needed to be with people		✓	
If it's a special event		✓	
I'd feel strange not doing it		✓	
I just feel normal		✓	✓
If my daughter upsets me, I panic to reach it		✓	
Flushing the medication out of my system		✓	
I enjoy drinking wine		✓	✓
I want to change the way I'm feeling		✓	
The coke was to keep up the happy		✓	
The social contact of it		✓	✓
I just like to drink		✓	✓
If I go out		✓	✓
I liked coke when I was on a high		✓	
It slowed you down		✓	
Calms you down		✓	✓
You wouldn't be quite so erratic		✓	
The coke just kept the feeling going		✓	
It used to be the thing to do		✓	
It keeps the high going longer		✓	
Less of a comedown from E (Prozac)		✓	
~~When they were in season~~		✓	
Weed really did calm me down perfectly		✓	
It's the only way to cope with it (mood)		✓	
It sparked them more as well, the highs		✓	
When in social situations with my family and that		✓	
When we get together		✓	
Loneliness		✓	✓✓
Loss of son		✓	
Stress of son's illness		✓	
Contact issues		✓	
Recreational use		✓	
Dependency		✓	✓
Cravings		✓	✓✓
I felt out of control		✓	

Its instant psychosis		✓	
I get memory loss		✓	
I had a bad trip and thought I was becoming really ill again		✓	
I feel really tired		✓	
My thoughts race		✓	
I can feel confused		✓	
I went out drinking a lot as a student		✓	
It does dis inhibit you		✓	
At Christmas, weddings, I'd drink more than I usually do		✓	
As a form of social protest		✓	
To the shops, then to the pub – it's a ritual		✓	
It blotted things out		✓	
It can make me isolate myself/ feel isolated		✓	
It just helped to pass the time		✓	
I feel more sensitive to highs and lows		✓	
Using an illegal drug to help me withdraw from a prescribed drug		✓	
To sedate you		✓	
I feel more depressed after		✓	
If they're around (friends) I wouldn't refuse		✓	
It helps to bring me down a bit		✓	
If alcohols about, I wouldn't refuse it		✓	
To drown my sorrows		✓	
It's a mood enhancer		✓	
Dulls your senses		✓	
Puts things on the back burner		✓	
It brings you down – slows thoughts		✓	
Stops me going high		✓	
When I'm in a good mood		✓	
Cope with loss of brother		✓	
To knock me out		✓	
To stop me thinking		✓	
To switch off		✓	
I find it hard to say no		✓	
It puts a lid on things		✓	
It's a tension reliever		✓	
To help to get up and function		✓	
To blot out emotional pain		✓	
Makes me peaceful		✓	
I get anxious		✓	
I have flashbacks		✓	
Frees my brain		✓	
It keeps me on an even keel		✓	
You can hibernate		✓	
It lifts your mood		✓	
You can forget your worries		✓	✓
It gives me a bit of space to get myself together		✓	
Blots out pain		✓	
It helps me to chill out		✓	✓
I feel guilty		✓	
It brings on a high		✓	
I didn't feel fantastic afterwards		✓	

It knocks me out		✓	
I black out		✓	
You feel you can do things and you obviously can't		✓	
I just feel better		✓	
You feel your brain switch on		✓	
Makes me feel worse		✓	
To get me out of the house			✓
I like the taste			✓
Its just my lifestyle			✓
To enhance conversation			✓
It's a routine			✓
It means I'm not isolated			✓
Its helps me re establish a sleep pattern			✓
To get giggly with your mates			✓
I like having something to do with my hands			✓
It makes me carry on			✓
It lets me focus			✓
Helps me to get things done			✓
Gives me motivation			✓
It helps me face up to things			✓
I can feel more bothered by past events			✓
Its addictive			✓
It takes pressure away			✓
Because its there			✓
If I stopped, I'd have too much energy then I'd go high			✓
Stops the mania coming on			✓
When I'm alone			✓
I feel worthless			✓
I felt suicidal			✓
It was scary			✓
I don't feel like talking to people after			✓
Makes you hallucinate			✓
I feel paranoid			✓
Stops my meds working			✓
Gives me a buzz			✓
Makes me quiet			✓
It makes me feel ill			✓
Bad for sleep			✓
I don't get quality sleep			✓
It suppresses my self esteem			✓

✓ Demonstrates which source statement was taken from
Shaded area - statements identified as 'after-effects'
~~Strikethrough~~ – external experience not included

Final Q set: Reasons

1 Makes me feel normal
2 Makes me feel less alone/ lonely
3 Helps me to celebrate success
4 Relieves side effects of medication
5 Its helps me to think
6 Satisfies my cravings/ dependency
7 Slows down my racing thoughts
8 Helps me to sleep
9 Enables me to join in with what family and friends are doing
10 Helps me get along with others when pressured to
11 Helps me to feel less irritable
12 Helps me manage low mood
13 Alleviates boredom
14 Helps me to achieve an altered state of mind
15 Helps me to relax
16 Reduces my anxiety
17 Helps me manage my visions
18 Helps me to manage my anger
19 Helps me to get/stay high/elated
20 Makes me less restless
21 Increases my creativity
22 Increases my motivation
23 Helps me focus/ get things done
24 Helps me cope with difficult/ memories
25 Increases my energy
26 Helps me deal with problems
27 Makes me more open to new ideas
28 Boosts my confidence/ self esteem
29 Helps me to fit in
30 Helps me manage my voices
31 Relieves physical pain
32 Makes me feel good
33 Makes me feel less suspicious
34 Makes me less inhibited
35 Helps me enjoy sexual experiences more
36 Helps me to switch off
37 Makes me more sociable
38 Stops me from feeling too high/ elated
39 Helps me to manage my appetite
41 Makes me feel calm
40 Fits into my routine/ lifestyle

Final Q set: After-effects

Positive:

1. I feel better
2. I feel more likeable
3. I feel a buzz
4. I feel more confident
5. I feel less irritable
6. I feel less angry
7. I have a better memory
8. I feel more motivated
9. I feel I can function better
10. I have a longer attention span
11. I feel more sociable
12. I can concentrate better

Negative

13. I have disturbed sleep
14. I have memory loss
15. I feel anxious
16. I feel fearful/scared
17. I feel confused
18. I have flashbacks
19. I feel ill
20. I feel more bothered by past events
21. I don't feel the benefit from my medication
22. I feel depressed
23. I feel suicidal
24. I feel isolated
25. I feel worthless
26. I black out
27. I feel paranoid
28. I feel guilty

Positive or negative

29. I feel sexually aroused
30. Stops me going high/ elated
31. I don't feel like talking to people
32. I have racing thoughts
33. I feel tired
34. I feel impulsive/ disinhibited
35. I get high/ elated
36. I feel out of control
37. I have hallucinations
38. I feel my thoughts slow down
39. I feel I can do things I normally can't
40. I feel more sensitive to highs and lows

Appendix 11: Pre-screen interview

Date: **PANO:**

Pre- Screen
Experiences of substance use in Bipolar Disorder

I'm calling on behalf of the PARADES programme as we have been told that you may be interested in taking part in our study.

Were you expecting a call from us? **YES** **NO**

What do you already know about our study?
Do you have any questions that I could clarify for you about this research?

Is it ok if I ask you a few questions to check that this study is likely to be suitable for you?

Would you confirm with me what your date of birth is please?

Do you have a diagnosis? **YES** **NO**
If yes, could you tell me what your diagnosis is?

Has there ever been a time when you were feeling depressed or down most of the day nearly every day? **YES** **NO**

How long did this last?
Has there ever been a period of time when you were feeling so good, 'high', excited or hyper that other people thought you were not your normal self? **YES** **NO**

How long did this last?

If no, ask: has there ever been a period of time when you were so irritable that you found yourself shouting at people or starting fights or arguments?
YES **NO**
Are you currently taking part in any other research programs?

If yes: what is it?
Now I'd like to ask you some questions about your use of Alcohol and/or Cannabis to check whether you meet the criteria for this study. This information will be completely confidential. Is this ok? **YES** **NO**

Alcohol

These questions are about your alcohol consumption:
What's your drinking been like recently?…

Have you drunk alcohol in the past 7 days?

How many drinks have you drunk in the past 7 days?
(*List types of drinks, amounts and units)*
Beer, Lager, cider*: 1 can = 2 units, 1 pint = 3 units*
Spirits*: single measure = 1 unit, double measure = 2 units*
Wine*: Small glass (125ml) = 1.5 unit, standard glass (175ml)= 2 units, large glass (250ml) = 3 units, bottle of wine (750ml) = 9 units*

Is this a typical week for you?

If not, how many weeks in the past 3 months have you drunk at this level?

Cannabis

These questions are about your use of marijuana (*dope, grass, hash, pot etc*).
What's your cannabis use been like recently?…

Have you smoked Cannabis this week (past 7 days)?

On each occasion how much cannabis have you smoked?
(Please list no of joints, bongs)

Is this a typical week for you?

If not, how many weeks in the past 3 months have you smoked at this level?

Thank you for answering. Based on what we have discussed, would you like to take part in this study? **YES NO**
Where would you like to meet with a researcher?
When is your preferred time to meet with a researcher?

Appendix 12: Internal state scale

For each of the following statements, please blacken the circle on the line that best describes the way you have felt over the past 24 hours. While there may have been some change during that time, try to give a single summary rating for each item.

Over the past 24 hours…

Not at all/……Very much so/
Rarely Much of the Time

My mood was changeable

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

I felt irritable

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

I felt like a capable person

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

I felt like people were out to get me

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

I felt great inside

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

I felt impulsive

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

I felt depressed

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

My thoughts are going fast

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

It seemed like nothing would ever work out for me

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

Not at all/……..Very much so/
Rarely Much of the Time

I felt overactive

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

I felt as if the world was against me

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

I felt sped up inside

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

I felt restless

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

I felt argumentative

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

I felt energized

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

Today I felt…

0 **100**
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

Depressed Normal Manic
Down High

Appendix 13: Patient Health Questionnaire - 9

PHQ 9 Patient Questionnaire

Over the *last 2 weeks,* how often have you been bothered by any of the following problems? *(use √ to indicate your answer)*

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling/staying asleep, sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself in some way.	0	1	2	3
Add Columns:		____ +	____ +	_____

TOTAL: ……..

If you checked off <u>any</u> problem on this questionnaire so far, how <u>difficult</u> have these problems made it for you to do your work, take care of things at home, or get along with other people?	Not difficult at all _____ Somewhat difficult _____ Very difficult _____ Extremely difficult _____

Appendix 14: Normal distribution data

Table 14.1: Normal distribution data for variables used in overall analysis (*n* = 50)

Variable	Skewness	Sd.err Skewness	Value	Kurtosis	Sd.err Kurtosis	Value
Age	0.15	0.34	0.44	-0.42	0.66	0.64
HAMD	1.35	0.34	3.97	1.46	0.66	2.21
HAM D Sq Rt	0.33	0.34	0.97	-0.37	0.66	-0.56
MAS	1.63	0.34	4.79	1.92	0.66	2.91
MAS Log 10	0.54	0.34	1.59	-0.73	0.66	-1.11
ISS (Activation)	0.42	0.34	1.24	-0.61	0.66	-0.92
PHQ	0.66	0.34	1.94	-0.51	0.66	-0.77
No days used MPS in past month	-0.84	0.34	-2.50	-0.82	0.66	-1.24
No days use Sqrt	-1.16	0.34	-3.41	0.23	0.66	0.35
No days use Log10	-1.74	0.34	-5.12	2.86	0.66	4.33
Period of use of MPS at this level	1.02	0.34	3	0.38	0.66	0.58
Periodo f use Sq rt	0.11	0.34	0.32	-0.80	0.66	-1.21

Shaded areas – data does not show normal distribution

Table 14.2: Normal distribution data for variables used in alcohol subgroup analyses (*n* = 29)

Variable	Skewness	Sd.err Skewness	Value	Kurtosis	Sd.err Kurtosis	Value
Age	0.14	0.43	0.33	-0.06	0.85	-0.07
OTI Score	1.00	0.43	2.33	-0.08	0.85	-0.09
OTI Sq Rt	0.51	0.43	1.19	-0.75	0.85	-0.88
No days used in past month	-0.57	0.43	1.33	-1.00	0.85	-1.18
Period of use at this level (yrs)	0.82	0.43	1.91	-0.52	0.85	-0.61
No days Binge in past month	0.35	0.43	0.81	-1.24	0.85	-1.46
HAM	1.09	0.43	2.53	0.39	0.85	0.46
HAM Sq Rt	0.24	0.43	0.56	-0.68	0.85	-0.80
MAS	2.67	0.43	6.21	7.57	0.85	8.91
MAS Log 10	0.90	0.43	2.09	0.85	0.85	1.00
MAS Sq rt	1.84	0.43	4.28	3.74	0.85	4.40
ISS (Activation)	0.52	0.43	1.21	0.03	0.85	0.04
PHQ	0.29	0.43	0.67	0.03	0.85	0.04

Shaded areas – data does not show normal distribution

Table 14.3: Normal distribution data for variables used in cannabis subgroup analyses (*n* = 21)

Variable	Skewness	Sd.err Skewness	Value	Kurtosis	Sd.err Kurtosis	Value
Age	0.23	0.50	0.46	-0.75	0.97	-0.77
OTI Score	0.88	0.50	1.76	0.33	0.97	0.34
No. days used in past month	-1.40	0.50	-2.8	0.19	0.97	0.20
No. days, Sq Rt (no effect)	-1.49	0.50	-2.98	0.51	0.97	0.53
No. days, Log 10 (no effect)	-1.60	0.50	-3.2	0.98	0.97	1.01
Period of use at this level (yrs)	1.12	0.50	2.24	0.53	0.97	0.55
Period use Sq Rt	0.11	0.50	0.22	-0.23	0.97	-0.24
HAM	1.96	0.50	3.92	5.25	0.97	5.41
HAM Log 10	-0.17	0.50	-0.34	-0.54	0.97	-0.56
MAS	0.88	0.50	1.76	-0.33	0.97	-0.34
ISS (Activation)	0.19	0.50	0.38	-1.126	0.97	1.16
PHQ	1.38	0.50	2.76	2.24	0.97	2.31
PHQ Log 10	-0.75	0.50	-1.50	1.57	0.97	1.62

Shaded areas – data does not show normal distribution

Appendix 15: Factor arrays

Table 15.1: Factor array - Reasons for Use: Alcohol subgroup

No. Statement	Factor 1 Mood management	Factor 2 Social coping
1 Makes me feel normal	2	-3
2 Makes me feel less alone/ lonely	1	1
3 Helps me to celebrate success	-1	-1
4 Relieves side effects of medication	-4	-2
5 Its helps me to think	-1	-3
6 Satisfies my cravings/ dependency	0	4
7 Slows down my racing thoughts	1	2
8 Helps me to sleep	2	1
9 Enables me to join in with what family and friends are doing	0	1
10 Helps me get along with others when pressured to	-2	0
11 Helps me to feel less irritable	1	0
12 Helps me manage low mood	3	1
13 Alleviates boredom	2	3
14 Helps me to achieve an altered state of mind	1	2
15 Helps me to relax	4	4
16 Reduces my anxiety	3	0
17 Helps me manage my visions	-4	-2
18 Helps me to manage my anger	-3	-4
19 Helps me to get/stay high/elated	0	-1
20 Makes me less restless	1	0
21 Increases my creativity	0	-4
22 Increases my motivation	-1	-3
23 Helps me focus/ get things done	-2	-2
24 Helps me cope with difficult/ memories	0	5
25 Increases my energy	-2	-2
26 Helps me deal with problems	0	-1
27 Makes me more open to new ideas	-1	-2
28 Boosts my confidence/ self esteem	2	0
29 Helps me to fit in	-1	2
30 Helps me manage my voices	-5	-1
31 Relieves physical pain	-3	1
32 Makes me feel good	5	1
33 Makes me feel less suspicious	-3	0
34 Makes me less inhibited	1	3
35 Helps me enjoy sexual experiences more	-2	-1
36 Helps me to switch off	3	3
37 Makes me more sociable	2	2
38 Stops me from feeling too high/ elated	0	-1
39 Helps me to manage my appetite	-2	-5
40 Fits into my routine/ lifestyle	-1	0
41 Makes me feel calm	4	2

Table 15.2: Factor array - Reasons for use: Cannabis sample

No. Statement	Factor 1 Managing high mood	Factor 2 Social Reasons	Factor 3 Cognitive enhancement
1 Makes me feel normal	-1	2	2
2 Makes me feel less alone/ lonely	-1	1	-1
3 Helps me to celebrate success	0	1	0
4 Relieves side effects of medication	-2	-1	-3
5 Its helps me to think	0	-3	2
6 Satisfies my cravings/ dependency	1	0	0
7 Slows down my racing thoughts	3	-1	-1
8 Helps me to sleep	5	1	-2
9 Enables me to join in with what family and friends are doing	-1	3	0
10 Helps me get along with others when pressured to	-2	0	-2
11 Helps me to feel less irritable	2	1	4
12 Helps me manage low mood	2	1	3
13 Alleviates boredom	1	2	1
14 Helps me to achieve an altered state of mind	2	0	1
15 Helps me to relax	4	3	4
16 Reduces my anxiety	1	0	3
17 Helps me manage my visions	-4	-3	-5
18 Helps me to manage my anger	1	0	1
19 Helps me to get/stay high/elated	-3	2	0
20 Makes me less restless	3	-2	1
21 Increases my creativity	0	-3	3
22 Increases my motivation	-3	-4	-1
23 Helps me focus/ get things done	-1	-5	2
24 Helps me cope with difficult/ memories	1	-2	-2
25 Increases my energy	-4	0	0
26 Helps me deal with problems	0	-2	2
27 Makes me more open to new ideas	0	-1	1
28 Boosts my confidence/ self esteem	-1	4	-2
29 Helps me to fit in	0	4	-3
30 Helps me manage my voices	-5	-4	-4
31 Relieves physical pain	1	-2	-1
32 Makes me feel good	2	3	5
33 Makes me feel less suspicious	-2	2	-4
34 Makes me less inhibited	-2	2	-2
35 Helps me enjoy sexual experiences more	-3	-2	-1
36 Helps me to switch off	3	0	1
37 Makes me more sociable	-1	5	-1
38 Stops me from feeling too high/ elated	2	-1	0
39 Helps me to manage my appetite	-2	-1	-3
40 Fits into my routine/ lifestyle	0	1	0
41 Makes me feel calm	4	-1	2

Table 15.3: Factor array - After-effects of substance use: Full sample

No. Statement	Factor 1 Positive after-effects	Factor 2 Negative after-effects	Factor 3 Getting 'high'
1 I feel more sociable	3	-2	4
2 I feel sexually aroused	0	-4	-1
3 Stops me going high/ elated	1	0	-4
4 I feel worthless	-1	2	-1
5 I black out	-3	-3	1
6 I feel paranoid	-3	1	2
7 I feel guilty	0	4	0
8 I don't feel like talking to people	-1	1	-2
9 I have racing thoughts	-3	3	2
10 I can concentrate better	2	-3	-3
11 I feel tired	2	3	1
12 I don't feel the benefit from my medication	-1	0	-1
13 I feel depressed	-2	3	0
14 I feel more bothered by past events	-2	2	-2
15 I feel suicidal	-4	-3	-5
16 I feel better	5	-1	2
17 I feel more likeable	2	-2	3
18 I have a longer attention span	1	0	-3
19 I feel more confident	3	-2	5
20 I feel less irritable	4	0	-1
21 I feel impulsive/ disinhibited	1	-1	3
22 I feel a buzz	2	-1	4
23 I get high/ elated	0	0	3
24 I feel ill	-2	5	1
25 I have flashbacks	-4	-1	-1
26 I feel out of control	-2	1	1
27 I feel fearful/scared	-1	2	0
28 I feel confused	-1	1	1
29 I have hallucinations	-5	-5	-2
30 I feel anxious	-2	4	0
31 I feel my thoughts slow down	3	0	2
32 I feel I can do things I normally can't	1	-2	1
33 I feel more sensitive to highs and lows	0	2	-3
34 I have disturbed sleep	1	1	0
35 I feel more motivated	1	-2	-2
36 I feel less angry	2	-1	-1
37 I have a better memory	-1	-4	-4
38 I feel isolated	0	2	0
39 I feel I can function better	4	-1	-2
40 I have memory loss	0	1	-2

Table 15.4: Factor Array - After-effects of use: Alcohol subgroup

No. Statement	**Factor 1 Positive after-effects**	**Factor 2 Negative after-effects**	**Factor 3 Getting 'high'**
1 I feel more sociable	1	-1	4
2 I feel sexually aroused	-2	-4	-1
3 Stops me going high/ elated	-2	0	-2
4 I feel worthless	0	2	2
5 I black out	-4	0	-2
6 I feel paranoid	-4	2	-1
7 I feel guilty	1	2	1
8 I don't feel like talking to people	2	0	0
9 I have racing thoughts	-3	3	0
10 I can concentrate better	2	-2	-2
11 I feel tired	1	2	2
12 I don't feel the benefit from my medication	-1	1	-1
13 I feel depressed	0	3	-1
14 I feel more bothered by past events	0	3	-2
15 I feel suicidal	-2	-2	-3
16 I feel better	3	-5	5
17 I feel more likeable	2	-2	2
18 I have a longer attention span	2	-1	-4
19 I feel more confident	4	-2	4
20 I feel less irritable	2	0	1
21 I feel impulsive/ disinhibited	1	-4	3
22 I feel a buzz	1	-2	2
23 I get high/ elated	-3	-1	1
24 I feel ill	-1	4	0
25 I have flashbacks	-1	1	-3
26 I feel out of control	-1	1	1
27 I feel fearful/scared	0	4	0
28 I feel confused	-1	1	1
29 I have hallucinations	-5	-3	-5
30 I feel anxious	-2	5	-1
31 I feel my thoughts slow down	3	0	3
32 I feel I can do things I normally can't	5	-1	0
33 I feel more sensitive to highs and lows	1	1	1
34 I have disturbed sleep	0	1	2
35 I feel more motivated	3	-1	-3
36 I feel less angry	-1	-3	2
37 I have a better memory	-2	-3	-4
38 I feel isolated	0	2	1
39 I feel I can function better	4	-1	-2
40 I have memory loss	-3	0	3

Table 15.5: Factor Array - After-effects of use: Cannabis subgroup

No. Statement	Factor 1	Factor 2	Factor 3	Factor 4
1 I feel more sociable	4	2	-3	0
2 I feel sexually aroused	-1	1	-2	-2
3 Stops me going high/ elated	-2	3	-2	1
4 I feel worthless	-1	-1	1	2
5 I black out	0	-2	-5	-3
6 I feel paranoid	0	-4	2	1
7 I feel guilty	-2	-1	4	-5
8 I don't feel like talking to people	-4	-1	3	3
9 I have racing thoughts	2	-4	1	-1
10 I can concentrate better	-2	3	2	-2
11 I feel tired	1	2	2	3
12 I don't feel the benefit from my medication	1	0	2	0
13 I feel depressed	0	-2	1	1
14 I feel more bothered by past events	-3	-1	2	1
15 I feel suicidal	-4	-2	-1	-1
16 I feel better	2	4	-4	4
17 I feel more likeable	3	2	-1	-1
18 I have a longer attention span	-2	2	1	-2
19 I feel more confident	4	2	-2	0
20 I feel less irritable	1	4	-1	5
21 I feel impulsive/ disinhibited	2	1	-2	0
22 I feel a buzz	5	1	-3	3
23 I get high/ elated	3	0	-2	-3
24 I feel ill	1	-5	0	1
25 I have flashbacks	-3	-1	-3	-2
26 I feel out of control	3	-3	1	-4
27 I feel fearful/scared	-2	-3	0	0
28 I feel confused	0	-1	1	2
29 I have hallucinations	-5	-3	-4	-1
30 I feel anxious	0	-2	5	-1
31 I feel my thoughts slow down	-2	3	1	2
32 I feel I can do things I normally can't	2	1	0	1
33 I feel more sensitive to highs and lows	1	0	4	2
34 I have disturbed sleep	0	0	3	-3
35 I feel more motivated	2	1	0	-1
36 I feel less angry	-1	1	-1	4
37 I have a better memory	-3	2	-1	-2
38 I feel isolated	-1	0	3	0
39 I feel I can function better	-1	5	-1	-4
40 I have memory loss	1	-2	0	2

Factor 1, Social enhancement; factor 2, cognitive enhancement; factor 3, negative after-effects; factor 4, personal/ emotional after-effects

Appendix 16: Tables presenting demographic, clinical and substance use differences between factors in subgroup analyses

Table 16.1: Demographic, clinical and substance use differences between participants in the alcohol subgroup (n = 29) loading on reasons factors

	Factor 1 Mood management (N = 20)	**Factor 2** Social coping (N = 9)	**Test, *p***
Demographic variables			
Mean age	42.2	43.44	t (27) = -0.26
SD	9.77	16.15	p = 0.80
	N (%)	N (%)	
Gender			
Male	8 (40)	6 (67)	χ^2 (1)= 1.77
Female	12 (60)	3 (33)	p = 0.25 (FET)
Marital status			
Married/ co habiting	4 (20)	1 (11)	χ^2 (1)= 0.34
Not married	16 (80)	8 (89)	p = 1.0 (FET)
Living arrangement			
Co habiting	10 (50)	3 (33)	χ^2 (1)= 0.70
Living alone	10 (50)	6 (67)	p = 0.45 (FET)
Education			
GCSE or below	7 (35)	7 (78)	χ^2 (1)= 4.55
Beyond GCSE	13 (65)	2 (22)	p = 0.05 (FET)
Parental status			
Parent	9 (45)	3 (33)	χ^2 (1)= 0.35
No children	11 (55)	6 (67)	p = 0.69 (FET)
Currently working			
Yes	5 (25)	1 (11)	χ^2 (1)= 0.73
No	15 (75)	8 (89)	p = 0.63 (FET)
Clinical variables	N (%)	N (%)	
No. depressive episodes:			
(<7)	8 (44)	2 (22)	χ^2 (2) = 4.36
(8 – 19)	3 (17)	5 (56)	p = 0.15 (FET)
(>20)	7 (39)	2 (22)	
No. manic episodes:			
(<7)	9 (50)	3 (37.5)	χ^2 (2)= 4.41
(8 – 19)	1 (6)	3 (33)	p = 0.14 (FET)
(>20)	8 (44)	2 (22)	
Mean HRSD Score *(trans: Sq rt)*	2.89	1.92	t (27) = 1.71 p = 0.10
MAS Score *(Mean rank)*	16.9	10.78	U = 52.0 p = 0.06
Mean ISS Activation	158	116.67	t (27) = 1.30 p = 0.21
Mean PHQ score	10.25	10.67	t (27) = -0.14 p = 0.90
Substance use variables	*N (%)*	*N (%)*	
SCID alcohol diagnosis:			
Current dependence	8 (40)	3 (33)	χ^2 (2)= 0.12
Current abuse	6 (30)	3 (33)	p = 1.00 (FET)
No alcohol disorder	6 (30)	3 (33)	

	Factor 1 Mood management (N = 20)	**Factor 2** Social coping (N = 9)	**Test, *p***
Mean OTI Alcohol Score *(trans Sq rt)*	2.77	2.85	t (27) = -0.18 p = 0.86
Mean No. days used alcohol in past month	18.45	22.67	t (27) = -1.20 p = 0.24
Mean period of use (years) at this level *(Alcohol; trans Sq rt)*	7.72	8.14	t (27) = -0.14 p = 0.90
No days binge drinking (past month estimate)	13.35	13.33	t (27) = 0.01 p = 1.00

FET, Fishers exact test; trans Sq rt, variable transformed using square root.

Table 16.2: Demographic, clinical and substance use differences between participants in the cannabis subgroup (n = 21) loading on reasons factors

	Factor 1 Mood (*N* = 12)	**Factor 2** Social (*N* = 3)	**Factor 3** Cognitive (*N* = 4)	**Test, *p***
Demographic variables				
Mean age	38.25	33.33	30.00	$F(2, 16) = 0.75$
SD	12.74	8.51	12.30	$p = 0.49$
	N (%)	*N* (%)	*N* (%)	
Gender				
Male	8 (67)	2 (67)	2 (50)	χ^2 (2) = 0.38
Female	4 (33)	1 (33)	2 (50)	*P* = 0.81 (FET)
Marital status				
Married/ co habiting	2 (17)	1 (33)	0	χ^2 (2) = 1.45
Not married	10 (83)	2 (67)	4 (100)	*P* = 0.50 (FET)
Living arrangement				
Co habiting	5 (42)	2 (67)	2 (50)	χ^2 (2) = 0.62
Living alone	7 (58)	1 (33)	2 (50)	*P* = 0.82 (FET)
Education				
GCSE or below	4 (33)	1 (33)	0	χ^2 (2) = 1.81
Beyond GCSE	8 (67)	2 (67)	4 (100)	*P* = 0.60 (FET)
Parental status				
Parent	5 (42)	1 (33)	1 (25)	χ^2 (2) = 0.38
No children	7 (58)	2 (67)	3 (75)	*P* = 1.00 (FET)
Currently working				
Yes	2 (17)	0	1 (25)	χ^2 (2) = 0.83
No	10 (83)	3 (100)	3 (75)	*P* = 1.00 (FET)
Clinical variables	*N (%)*	*N (%)*	*N (%)*	
No. depressive episodes:				
(<7)	2 (22)	2 (100)	2 (67)	χ^2 (4) = 5.19
(8 – 19)	2 (22)	0 (0)	0 (0)	*p* = 0.34 (FET)
(>20)	5 (56)	0 (0)	1 (33)	
No. manic episodes:				
(<7)	2 (20)	2 (67)	2 (50)	χ^2 (4) = 5.08
(8 – 19)	2 (20)	1 (33)	0 (0)	*p* = 0.31 (FET)
(>20)	6 (60)	0 (0)	1 (25)	
Mean HRSD Score *(trans: Log)*	0.89	0.49	0.67	$F(2, 16) = 1.65$ p = 0.22
Mean MAS Score	3.58	0.33	1.17	$F(2, 16) = 1.65$ $p = 0.22$
Mean ISS Activation	183.33	113.33	135.00	$F(2, 16) = 0.74$ $p = 0.49$
Mean PHQ score *(trans: Log)*	0.87	0.69	0.85	$F(2, 16) = 0.35$ $p = 0.71$
Substance use variables				
SCID cann. diagnosis:				
Current dependence	6 (50)	2 (67)	3 (75)	χ^2 (4) = 1.61
Current abuse	2 (17)	0 (0)	0 (0)	*p* = 1.00 (FET)
No cann. disorder	4 (33)	1 (33)	1 (25)	

	Factor 1 Mood (N = 12)	**Factor 2** Social (N = 3)	**Factor 3** Cognitive (N = 4)	**Test, *p***
Mean OTI Cann. Score	5.20	3.42	7.00	$F(2, 16) = 0.67$ $p = 0.53$
No. days used cann. in past month (mean rank)	11.08	6.50	9.38	$H(2) = 2.21$ $p = 0.33$
Period of use at this level (Cann; trans Sq rt)	3.28	3.43	2.97	$F(2, 16) = 0.87$ $p = 0.44$

FET, Fishers exact test; *trans:* Log, variable transformed using log transformation; Cann, Cannabis.

Table 16.3: Demographic, clinical and substance use differences between participants in the alcohol subgroup (n = 29) loading on after-effects factors

	Factor 1 Positive *N* = 6	**Factor 2** Negative *N* = 10	**Factor 3** 'High' *N* = 8	**Test, *p***
Demographic variables				
Mean age	41.5	45.6	39.5	$F(2, 21) = 0.66$
SD	14.28	10.57	10.35	$p = 0.53$
	N (%)	*N* (%)	*N* (%)	
Gender	1 (17)	4 (40)	5 (62.5)	χ^2 (2) = 2.99
Male	5 (83)	6 (60)	3 (37.5)	$p = 0.26$ (FET)
Female				
Marital status				
Married/ co habiting	1 (17)	2 (20)	2 (25)	χ^2 (2) = 1.15
Not married	5 (83)	8 (80)	6 (75)	$P = 1.00$ (FET)
Living arrangement				
Co habiting	3 (50)	4 (40)	5 (62.5)	χ^2 (2) = 0.90
Living alone	3 (50)	6 (60)	3 (37.5)	$p = 0.87$ (FET)
Education				
GCSE or below	2 (33)	4 (40)	4 (50)	χ^2 (2) = 0.41
Beyond GCSE	4 (67)	6 (60)	4 (50)	$p = 0.88$ (FET)
Parental status				
Parent	4 (67)	5 (50)	4 (50)	χ^2 (2) = 0.50
No children	2 (33)	5 (50)	4 (50)	$p = 0.77$ (FET)
Currently working				
Yes	**+** 3 (50)	**-** 0	2 (25)	χ^2 (2) = 5.81
No	**-** 3 (50)	**+** 10 (100)	6 (75)	$p = 0.04$ (FET)
Clinical variables				
No. depress episodes:				
(<7)	2 (33)	3 (33)	3 (37.5)	χ^2 (4)= 6.54
(8 – 19)	3 (50)	4 (44)	0 (0)	$p = 0.17$ (FET)
(>20)	1 (17)	2 (22)	5 (62.5)	
No. manic episodes:				
(<7)	3 (60)	2 (22)	5 (71)	χ^2 (4)= 6.48
(8 – 19)	0 (0)	3 (33)	0 (0)	$p = 0.25$ (FET)
(>20)	2 (40)	4 (44)	2 (29)	
Mean HRSD Score *(trans: Sq rt)*	2.22	2.88	2.44	$F(2, 21) = 0.37$ $p = 0.70$
MAS Score *(Mean rank)*	8.75	10.75	17.50	$H(2) = 7.40$ $p = 0.03$
Mean ISS Activation Score	131.67	153.00	142.50	$F(2, 21) = 0.14$ $p = 0.87$
Mean PHQ score	9.33	9.90	11.88	$F(2, 21) = 0.25$ $p = 0.78$

	Factor 1 Positive *N* = 6	**Factor 2** Negative *N* = 10	**Factor 3** 'High' *N* = 8	**Test, *p***
Substance use variables				
SCID Alc diagnosis:				
Current dependence	3 (50)	4 (40)	2 (25)	χ^2 (4)= 4.24
Current abuse	0 (0)	3 (30)	4 (50)	*p* = 0.40 (FET)
No alcohol disorder	3 (50)	3 (30)	2 (25)	
Mean OTI Alcohol Score *(trans Sq rt)*	2.71	3.10	2.23	*F* (2, 21) = 1.94 *p* = 0.17
Mean no. days used in past month (Alcohol)	17.17	23.40	14.75	*F* (2, 21) = 2.97 *p* = 0.08
Mean period of use (years) at this level *(Alc; trans Sq rt)*	7.53	9.23	9.39	*F* (2, 21) = 0.11 *p* = 0.90
No. days binge drinking in month *Mean rank*	12.8	15.8	8.69	*H* (2) = 4.59 *p* = 0.10

FET, Fishers exact test; trans Sq rt, variable transformed using square root; **+**, adjusted residuals in cells indicate over representation; **-**, adjusted residuals in cells indicated under representation.

Table 16.4: Demographic, clinical and substance use differences between participants in the cannabis subgroup (n = 21) loading on after-effects factors

	Factor 1 Social *N* =2	**Factor 2 Cog E** *N* = 9	**Factor 3 Neg** *N* = 2	**Factor 4 Pers** *N* = 5	**Test, *p***
Demographic variables					
Mean age	28.5	40.67	33.50	40.80	$F(3, 14) = 0.67$
SD	2.12	8.86	17.68	17.85	$p = 0.58$
	N (%)	*N* (%)	*N* (%)	*N* (%)	
Gender					
Male	1 (50)	8 (89)	1 (50)	4 (80)	χ^2 (3) = 2.44
Female	1 (50)	1 (11)	1 (50)	1 (20)	$p = 0.51$ (FET)
Marital status					
Married/ co habiting	0 (0)	1 (11)	1 (50)	1 (20)	χ^2 (3) = 2.24
Not married	2 (100)	8 (89)	1 (50)	4 (80)	$p = 0.78$ (FET)
Living arrange.					
Co habiting	1 (50)	2 (22)	2 (100)	2 (40)	χ^2 (3) = 4.30
Living alone	1 (50)	7 (78)	0	3 (60)	$p = 0.24$ (FET)
Education					
GCSE or below	0 (0)	2 (22)	1 (50)	2 (40)	χ^2 (3) = 1.77
Beyond GCSE	2 (100)	7 (78)	1 (50)	3 (60)	$p = 0.71$ (FET)
Parental status					
Parent	0 (0)	4 (44)	0	3 (60)	χ^2 (3) = 3.60
No children	2 (100)	5 (56)	2 (100)	2 (40)	$p = 0.51$ (FET)
Currently working					
Yes	0	0	1 (50)	1 (20)	χ^2 (3) = 4.84
No	2 (100)	9 (100)	1 (50)	4 (80)	$p = 0.24$ (FET)
Clinical variables					
No. depressive ep.					
(<7)	1 (100)	4 (44)	0	1 (50)	χ^2 (6) = 15.30
(8 – 19)	0	0	**+** 2 (100)	0	$p = 0.05$ (FET)
(>20)	0	5 (56)	0	1 (50)	
No. manic ep.					
(<7)	1 (50)	2 (25)	0	2 (50)	χ^2 (6) = 14.73
(8 – 19)	1 (50)	0	**+** 2 (100)	0	$p = 0.02$ (FET)
(>20)	0	**+** 6 (75)	0	2 (50)	
Mean HRSD Score *(trans: Log)*	0.50	0.75	1.13	0.83	$F(3, 14) = 0.89$ $p = 0.47$
Mean MAS Score	0.50	4	6	2.8	$F(3, 14) = 0.88$ $p = 0.48$
Mean ISS Activation Score	95	215.56	230	98	$F(3, 14) = 2.29$ $p = 0.12$
Mean PHQ score *(trans: Log)*	0.50	0.92	1.26	0.77	$F(3, 14) = 2.34$ $p = 0.12$
Substance use variables					
SCID cann diag:					
Current depend.	1 (50)	6 (67)	2 (100)	2 (40)	χ^2 (6) = 6.63
Current abuse	0	2 (22)	0	0	$p = 0.49$ (FET)
No cann disord.	1 (50)	1 (11)	0 (0)	3 (60)	

	Factor 1 *N* = 2	**Factor 2** *N* = 9	**Factor 3** *N* = 2	**Factor 4** *N* = 5	**Test, *p***
OTI Cann Score	3.13	6.19	2.50	6.04	$F(3, 14) = 0.64$ $p = 0.60$
No. days used Cann. in month (Mean rank)	2.5	11.72	12.5	7.10	$H(3) = 9.43$ $p = 0.02$
Mean period use (years) at level *(Cann; trans Sq rt)*	2.45	3.48	1.52	2.70	$F(3, 14) = 1.08$ $p = 0.39$

Social, Social enhancement; Cog E, Cognitive enhancement; Neg, Negative after-effects; Pers, personal/ emotional after-effects; FET, Fishers exact test; trans Sq rt, variable transformed using square root; *trans:* Log, variable transformed using log transformation; **+**, adjusted residuals in cells indicate over representation; **-**, adjusted residuals in cells indicated under representation; cann. Cannabis