Reasons for Substance Use in Psychosis

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Abstract

Large numbers of people with a diagnosis of psychosis use drugs and alcohol, resulting in poorer symptomatic and functional outcomes for many. A better understanding of the causes of this increased comorbidity is necessary if treatments designed to help people with psychosis abstain from or reduce their substance use are to be successful. The aim of this programme of research was to examine reasons for substance use in people with psychosis; to develop a new self report questionnaire of reasons for substance use and to use the new measure to test a multiple risk factor model of substance use maintenance. The psychometric properties of the new Reasons for Substance use in Schizophrenia (ReSUS) questionnaire were investigated in a clinical sample (n = 230) and the relationship of the different ReSUS subscales to psychopathology, coping strategies and substance use were examined in a series of studies. Coping reasons for use were less frequently endorsed than social and individual enhancement reasons but were related to psychopathology and to problematic substance use in both clinical and non-clinical samples. Coping reasons, enhancement reasons and dysfunctional coping strategies partially mediated the relationship between psychopathology and problematic substance use in a non-clinical sample (n = 221). Distress in relation to symptoms and coping reasons for use mediated the relationship between symptoms and substance use consequences in a clinical sample (n = 82) indicating that some substance use may be considered an attempt to self medicate psychiatric symptoms. An experience sampling study of cannabis use in daily life (n = 42) investigated the temporal relationship between symptoms and cannabis use and found that affect but not positive symptoms predicted cannabis use for a subgroup of people who reported using cannabis to cope: for these individuals cannabis use was more likely when positive affect was reduced and when negative affect was increased. The studies in this thesis have methodological limitations that will need to be addressed through future research. However, they extend the current literature on substance use in psychosis and lend credence to a cognitive motivational perspective on substance use. Results highlight the role of coping reasons for use in predicting substance use outcome and suggest that future research and clinical work in psychosis and substance use comorbidity should take self reported reasons for use into account.

Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

The author was primarily responsible for the development and writing of the thesis. The PhD supervisors, Professors Barrowclough and Haddock, guided the development of ideas for the research programme and the interpretation of findings. Both supervisors commented on the final drafts of the papers included in the thesis and are therefore credited as co-authors on the three published papers. Dr Richard Emsley conducted the structural equation modelling analyses included in chapters five and six; contributed to the methods section of these two chapters and commented on the initial draft.

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Rationale for submission of the thesis in alternative format

Three papers resulting from this programme of research thesis have already been published (chapters one, three and four). The three remaining empirical papers (chapter five, six and seven) have been prepared for publication and will be submitted for peer review in the future.

The author

I graduated from the University of Manchester in 1996 with a BSc honours degree in Psychology, followed in 1997 by an MRes degree in Informatics from the Computer Science Department. I worked in local government research before returning to Manchester as a researcher in 2001. I am a Senior Research Associate in the division of clinical psychology and have worked on a wide range of studies including the MIDAS trial (Motivational Interventions for Drugs & Alcohol misuse in Schizophrenia, Barrowclough et al, 2009). I am currently the Trial Manager of the ReCAP trial: Rethinking Choices after Psychosis, A phase-specific psychological therapy for people with problematic cannabis use following a first episode of psychosis.

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On a personal level I would like to thank my husband Nick for his patience and good humour. Without his support this PhD would not have been possible. Thank you also to our fabulous daughters Abigail and Meredith, who give me a reason to smile every day.

Dedication

This thesis is dedicated to the memory of my Grandfather William J. Kilty. He was proud of me whatever I did, but would have been especially pleased with this. I'm sorry you didn't get to see me finish Grand.

Context and Overview of Research

Around half of all people with psychosis have a co-occurring substance use problem, (Regier et al, 1990), a much higher prevalence rate than that found in the general population. Alcohol and cannabis are the most frequently used substances, and multiple substance use is common (Weaver et al, 2003). This comorbidity has profound implications for the course and treatment of psychotic disorders. People with psychosis who use drugs and alcohol have been reported to have poorer symptomatic and functional outcomes than their non substance using counterparts (Margolese, Malchy, Negrete, Tempier & Gill, 2004): they experience more symptoms, are less likely to be compliant with medication, are at greater risk of relapse and hospitalization and as a consequence make greater use of mental health services. The causes of this increased comorbidity are not yet fully understood. There is evidence that cannabis may act as a specific trigger for psychosis in some vulnerable individuals but simple broad models of either substance use causing schizophrenia or schizophrenia causing substance use have largely been discredited and multiple risk factor models of comorbidity have not been adequately tested. There is a clear need to understand the reasons for high rates of substance use by people with psychosis if treatments designed to help patients reduce their substance use are to be successful.

The broad aim of this programme of research was to better understand why people with psychosis use drugs and alcohol. The focus was on exploring self reported reasons for substance use and examining the extent to which substance use may be considered an attempt to self medicate psychiatric symptoms or the secondary consequences of those symptoms (distress). The primary aim was to test a multiple risk factor model of substance use maintenance which hypothesises reasons for use and coping strategies to be the intermediary factors between psychopathology and substance use. In order to achieve this aim it was necessary to develop a new questionnaire measure of reasons for substance use. Secondary aims were therefore to test the psychometric properties of the newly developed questionnaire and to investigate the relationship of the questionnaire subscales to substance use and to psychiatric symptoms.

The PhD is presented as a series of papers. The first in the series, Chapter one, is a literature review which examines the reasons for increased substance use by people with psychosis. The review summarises the main models proposed to account for comorbid substance use by people with psychosis and contains a comprehensive review of the self report reasons for substance use literature. The primary purpose of the review was to identify gaps in the literature and formulate hypotheses for the research programme. The review highlighted important methodological differences between studies in previous research (e.g. the diagnostic criteria employed; the type of sample used) and revealed that most of the questionnaires used to assess self reported reasons for substance use had not been psychometrically evaluated or had not been developed for use with people with psychosis, hence the decision to develop a new questionnaire measure. Chapter two is the methods section which details the rationale for the methods chosen for the individual studies, study recruitment procedures and ethical considerations (more detailed descriptions of the methods used are included in the method sections in the relevant chapters).

The first empirical paper, chapter three, describes a study utilising Q methodology (Stephenson, 1953) to examine reasons for substance use in a sample of people with psychosis. The results of this study were used to develop the new questionnaire measure assessing reasons for substance use (the Reasons for Substance Use in Schizophrenia questionnaire, ReSUS) and chapter four reports on the subsequent development and validation of the new questionnaire in a large clinical sample. Chapter four also examines the relationship of reasons for use to psychopathology and substance use. Chapter five outlines an internet based questionnaire study of reasons for substance use in a large analogue sample (university students) in which the relationship of reasons for substance use to schizotypy and substance use is examined. The paper also provides an additional test of the model tested in the main paper, chapter six. Chapter six reports on a study using structural equation modelling (SEM) to test and refine the hypothesised model of substance use. Participants in this study were a subsample of the people whose data contributed to chapter four.

Chapter seven contains the results of an experience sampling study (ESM) of daily cannabis use. This study, which employs a prospective design, is perhaps the most important in the series. It examines whether cannabis use in daily life varies as a

function of psychopathology and also whether psychopathology predicts cannabis use in daily life. ESM avoids the retrospective assessment of substance use and psychopathology and, unhindered by recall bias, provides an excellent test of the self medication hypothesis. The thesis concludes with chapter eight, the general discussion, which discusses the main findings reported in the five empirical papers; summarises the main methodological limitations and outlines the clinical implications of the main results and suggestions for future research.

Chapter 1

Reasons for Increased Substance Use in Psychosis: A Review

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Abstract

Around half of all patients with schizophrenia are thought to abuse drugs or alcohol and there is good evidence to suggest that they have poorer outcomes than their non substance using counterparts. However, despite more than twenty years of research there is still no consensus on the aetiology of increased rates of substance use in people with psychosis. There is a clear need to understand the reasons for such high rates of substance use if treatments designed to help patients abstain from substance use are to be successful. This paper provides an update of the literature examining the reasons for substance use by people with psychosis, and includes a comprehensive review of the self report literature. The main theories as to why people with psychosis use substances are presented. There is evidence to suggest that cannabis may have a causal role in the development of psychopathology but not for other substances. The self report literature provides support for an 'alleviation of dysphoria' model of substance use but there is little empirical support for the self medication hypothesis, or for common factor models and bidirectional models of comorbidity. It is likely that there are multiple risk factors involved in substance use in psychosis and more work to develop and test multiple risk factor models is required.

A substantial number of patients with schizophrenia are known to abuse drugs and alcohol (Mueser, Yarnold, & Bellack, 1992; Regier, Farmer, Rae, Locke, Keith, Judd & Goodwin, 1990) and rates of substance use are significantly higher in this group than in the general population (Regier et al, 1990). Comorbidity has profound implications for the course and treatment of schizophrenia: there is good evidence to suggest that people with schizophrenia who abuse drugs and alcohol have poorer outcomes than both their non substance using counterparts and substance users in the general population (e.g. Drake & Wallach, 1989; Margolese, Malchy, Negrete, Tempier, & Gill, 2004). Whilst substance use disorders have such negative consequences for this patient group, motivation for reduction of substance use in clients with psychosis is usually low (Baker et al, 2002; Barrowclough et al 2001) Hence there is a clear need to understand the reasons for such high rates of substance use if treatments designed to help patients reduce their substance use are to be successful. The aim of this paper is to review the literature which examines the causes of and reasons for substance use by people with schizophrenia, and to critically review research on the self reported reasons for substance use by this client group.

Research examining the relationship between psychosis and substance use has continued apace since the publication of previous reviews (e.g. Batel, 2000; Blanchard, Brown, Horan & Sherwood, 2000; Mueser, Drake & Wallach, 1998) and a number of good quality studies have been conducted with the aim of investigating reasons for increased comorbidity in this client group. Six prospective cohort studies examining the link between cannabis use and psychosis have been reported in the past five years and eight investigations of the self reported reasons for substance use have been conducted. Prior to 2000 there was little in the way of longitudinal research and the studies examining the self reported effects or reasons for substance use had significant methodological limitations (Green, Kavanagh & Young, 2004). Hence an updated review of the literature in this area is timely. To provide a context to the review, the prevalence of substance use by patients with schizophrenia will first be discussed and the correlates and the consequences of substance use by this patient group will be described.

1.1. Substance use prevalence

Estimates of lifetime prevalence for individuals with schizophrenia are around 50% (Mueser, Bennet & Kushner, 1995; Regier et al, 1990) and rates for current substance use have been reported to be as high as 65% in some samples (Mueser et al, 1992). Estimates vary significantly across studies, primarily because of methodological differences such as the way that such "dual diagnosis" is defined. Such differences include the diagnostic criteria for both psychosis and substance use; the validity of the measures employed to assess both disorders; the population that is being investigated (for example, whether inpatient or outpatient) and the location of that population (the country the research is taking place in and whether the population is rural or urban) but nevertheless, the overwhelming majority of studies have reported that substance use disorders are more prevalent in patients with psychosis than in the general population.

In the largest prevalence study conducted in the US (the Epidemiologic Catchment Area Study, ECA, Regier et al, 1990) more than twenty thousand structured interviews were conducted. More than a quarter (27%) of those with schizophrenia had experienced a drug abuse disorder in comparison to 6.1% of the general population and one third (33.7%) had an alcohol disorder compared to 13.5% in the general population. For individuals with schizophrenia, the odds of having an alcohol disorder were three times higher than in the general population and the odds of having another substance use disorder were six times higher. Overall, 47% of people with schizophrenia had experienced some substance abuse or dependence. The US National Comorbidity study (Kessler, Crum et al, 1997) reported comparable lifetime comorbidity rates to the ECA.

The UK studies have tended to reveal lower lifetime prevalence rates than those in the US. The UK national psychiatric morbidity survey (Farrell et al, 1998) reported a lifetime substance use prevalence rate of 7% for those with schizophrenia, delusional disorders or schizoaffective disorders and Duke, Pantelis, McPhillips & Barnes (2001) reported a lifetime prevalence rate of 16% for substance use by patients with schizophrenia in a London based survey. More recently, the West London First-Episode Schizophrenia study (Barnes, Mutsatsa, Hutton, Watt & Joyce, 2006)

reported lifetime rates of 27% for problems with alcohol use and 68% for lifetime substance use.

Current and one-year substance use prevalence rates range between 19.5% (Cantwell et al, 1999) and 44% (Weaver et al, 2003) in the UK and are broadly comparable to those reported in the US (Kessler, Crum et al, 1997; Swartz et al, 2006).

Research in Germany (Soyka et al, 1993); Finland (Korkeila et al, 2005) Italy (Mauri et al, 2006); Canada (Margolese et al, 2004; Van Mastrigt, Addington & Addington, 2004); Australia (Jablensky et al, 2000) and Brazil (Rossi Menezes & Ratto, 2004) has demonstrated considerable variability in both prevalence rates and in patterns of use across countries. Undoubtedly some of this variability will be due to methodological differences between the studies but it may also indicate that substance use comorbidity depends on environmental and cultural differences, including drug availability.

The types of substance used by patients with schizophrenia vary widely (Schneier & Siris, 1987). Alcohol and cannabis are the substances used most commonly in both US and UK samples (e.g. Kessler, Crum et al, 1997; Weaver et al, 2003) but patterns of stimulant and opiate use vary across studies. For many 'dually diagnosed' patients multiple drug and alcohol use is common, with a significant number of patients with schizophrenia abusing more than one substance (Baigent, Holme & Hafner, 1995; Drake, Osher & Wallach, 1989). In the study by Weaver et al (2003) 40.2% of those reporting problem drug use also reported harmful alcohol use. This polysubstance use means that it is often difficult to disentangle the correlates of and the effects of different substances or classes of substances.

1.2. Correlates of substance use

The demographic correlates of substance use are well documented (e.g. Kavanagh et al, 2004; Sevy et al, 2001). Demographic profiles vary according to the type of substance used (Mueser et al, 1992), for example alcohol users tend to be older than users of non-alcoholic substances (Salyers & Meuser, 2001), but there is some consistency in the other main correlates identified. People with schizophrenia who also have substance use disorders are more likely to be male than their non substance

using counterparts, they also tend to be younger (with the exception of alcohol users), less well educated and are more likely to have a family history of substance use problems (e.g. Barnes et al, 2006; Cantwell, 2003; Kavanagh et al, 2004; Menezes et al, 1996; Mueser et al, 1995a). Problem substance use has also been associated with an earlier onset of schizophrenia (Kovasznay et al, 1997; Mauri et al, 2006). Other, less reliable correlates include higher IQ (Sevy et al, 2001) and racial origin (Mueser et al, 1992). Relatively few studies have investigated the relationship between substance use and psychiatric history but those that have reported that substance use is associated with better premorbid functioning (e.g. Carey et al, 2003; Dixon et al, 1991; Sevy et al, 2001). People with schizophrenia who are more socially active are reported to have increased exposure to substances through their social networks (Salyers & Mueser, 2001). The only reliable clinical correlate to be identified is antisocial personality disorder (e.g. Kavanagh et al, 2004). Studies have shown that patients with schizophrenia and antisocial personality disorder (ASPD) are more likely to have comorbid substance use disorder than patients without ASPD (Caton, Shrout, Eagle, Opler, & Felix, 1994; Mueser et al, 2000). Furthermore, Mueser, Drake et al (1997) found that for patients with schizophrenia and substance use disorder ASPD is associated with a more severe course of substance use disorder including earlier age of onset and larger quantities of substance use.

1.3. Consequences of substance use

In addition to the negative impacts on a person's internal state caused by substance use (for example depressed mood, increased perceptual and cognitive anomalies, increased arousal, unpleasant withdrawal symptoms) and the physical consequences of drug or alcohol use (for example liver damage) there are a number of long term social and clinical consequences associated with drug and alcohol use. In common with substance users in the general population, substance users with schizophrenia are likely to experience financial problems associated with that use. They are also at increased risk of illness and injury (Dickey, Azeni, Weiss, & Sederer, 2000) including problems associated with risky behaviours such as unprotected sex and needle sharing, for example HIV (Carey et al, 2004). It has been argued that people with psychosis are particularly sensitive to the negative effects of certain substances (Chambers, Krystal & Self, 2001; Verdoux, Gindre, Sorbara, Tournier, & Swendsen,

2003) and that negative consequences result from lower levels of use than in the general population (Drake et al 1989).

Clinically, substance users with schizophrenia are at increased risk of poorer symptomatic and functional outcomes than their non substance using counterparts. Substance use is associated with more positive symptoms (Pencer & Addington, 2003) and with more relapses and hospitalisations (Linszen, Dingemans & Lenior, 1994; Swofford, Kasckow, Scheller-Gilkey & Inderbitzin, 1996). The study by Menezes et al (1996) reported that inpatient admission rates among dually diagnosed patients were almost double those of patients with psychosis alone. Patients with schizophrenia who abuse drugs and/or alcohol have increased rates of suicidal ideation (Bartels, Drake & McHugo, 1992; Hawton, Sutton, Haw, Sinclair, & Deeks, 2005; Kamali et al, 2000) increased aggression and violence (Cuffel, Shumway, Choulgian, & MacDonald, 1994; Fulwiler, Grossman, Forbes, & Ruthazer, 1997) and higher rates of treatment noncompliance (Coldham, Addington & Addington, 2002; Drake & Wallach, 1989; Janssen et al, 2006; Owen, Fischer, Booth & Cuffel, 1996) including medication non-adherence and failure to attend appointments. As a result, comorbid patients are more likely to be offered typical antipsychotic medication via depot injection. Substance users also tend to report greater extrapyramindal symptoms than abstinent patients (Potvin et al, 2006) and are at greater risk of tardive dyskinesia (Dixon, Weiden, Haas, Sweeny & Frances, 1992). Other consequences of substance use in this patient group include interpersonal conflict and stress (Barrowclough, Ward, Wearden & Gregg, 2005; Kashner et al, 1991) for example, conflict with relatives, partners and service providers who disapprove of substance use and blame clients for worsening their situation. People with schizophrenia who use substances are also at increased risk of social exclusion (Todd et al, 2004) and ultimately, homelessness and housing instability (Drake, Osher & Wallach, 1991).

1.4. Explanations of comorbidity

Four broad explanations of substance use in schizophrenia have been suggested (Kushner & Mueser, 1993; Mueser et al, 1998): (1) substance use causes schizophrenia; (2) substance use is a consequence of schizophrenia; (3)

schizophrenia and substance use share a common origin; and (4) schizophrenia and substance use interact and maintain each other. The bulk of the existing research literature has focused on the first two explanations of aetiology.

An understanding of the temporal relationship between the onset of schizophrenia and substance may help to elucidate whether either of the two disorders is primary (if substance use is generally found to occur prior to schizophrenia the second hypothesis would be less plausible). However, temporal order is extremely difficult to establish. Both schizophrenia and substance use disorder tend to develop gradually after beginning in adolescence or early adulthood, and the marked functional decline that accompanies them both makes it difficult to determine the most relevant factor. The studies that have attempted to establish temporal order have so far been contradictory. Silver & Abboud (1994), for example, reported that 60% of patients with schizophrenia who used drugs had done so before their first admission and Linszen et al (1994) reported that cannabis use preceded onset of schizophrenia in 23 out of the 24 patients in their study. Cantwell et al's (1999) study of 168 patients with first episode schizophrenia found that over a third (37%) reported substance use before presentation to services. In contrast, the US national comorbidity survey (Kessler, Crum et al, 1997) noted that in patients with co-occurring mental health and substance related disorders the mental disorder developed first in the vast majority of cases. Hambrecht & Hafner (1996) conducted a retrospective study with 232 patients with schizophrenia and found that one third of patients had a drug problem for more than one year before the schizophrenia began, for another third the onset of schizophrenia occurred at a similar time to the onset of substance use and for the final third the began more than a year before the substance use. Hambrecht & Hafner interpreted these findings in terms of a vulnerability-stress-coping model stating that the first group might have their vulnerability threshold reduced or their coping resources diminished as a result of their substance use. The second group might contain people who are already vulnerable to schizophrenia for whom substance misuse is a stress factor precipitating the onset of psychosis whilst the third group uses substances for self medicating against or 'coping with' the symptoms of schizophrenia.

The results of these studies are difficult to interpret and compare because of the choice of marker used to date illness onset. For Silver & Abboud (1994) the date of the first psychiatric admission was taken to be the onset of schizophrenia but for some patients, the first symptoms of schizophrenia appear months or even years before admission and may still, therefore, predate substance use. In other studies, onset of illness is based on patient reports but the use of retrospective patients' reports is also problematic: patients' memories of past states are likely to be unreliable, especially when complicated by intoxication.

1.4.1. Does substance use cause psychosis?

The studies that are best positioned to test whether substance use causes psychosis are prospective cohort studies (preferably from birth) but few of these exist and those that do have focused exclusively on the link between cannabis use and psychosis.

Cannabis and Psychosis

There is now a huge literature on the relationship between cannabis and psychosis: 180+ articles have been indexed on PubMed since 2000 with over 100 of these appearing in the last two years. Estimates of cannabis use by people with schizophrenia are high. Green, Young & Kavanagh (2005) analysed prevalence data from 53 English language treatment studies and reported a prevalence rate for current use of 23% and 11.3% for current misuse. Lifetime prevalence rates for use and misuse were 42.1% and 22.5% respectively. A large number of studies have reported a significant association between cannabis use and psychosis and there is abundant evidence of the link between the two in epidemiological studies involving the general population (e.g. Cuffel, Heithoff & Lawson, 1993; Degenhardt & Hall, 2001).

Recent experimental work investigating the effects of delta-9-tetrahydrocannabinol (Δ-9-THC, the major psychoactive component of cannabis) provides evidence of an association between cannabis and psychosis: Δ-9-THC produces schizophrenia-like positive and negative symptoms in healthy individuals (D'Souza et al, 2004) and transiently increases positive, negative and general schizophrenia symptoms in patients with schizophrenia (D'Souza et al, 2005). Furthermore, patients with schizophrenia are more vulnerable to the effects of Δ-9-THC than those without. Whilst confirming that cannabis can cause transient psychosis or transiently

exacerbate existing psychosis these studies to not show whether cannabis can actually cause schizophrenia or other functional psychotic illness in the long term.

Evidence for a more long term causal association comes from the cohort studies which have examined the link in prospective longitudinal studies. The first of these studies was conducted by Andreasson, Allebeck, Engstrom & Rydberg, 1987). More than forty-five thousand soldiers who had been conscripted into the Swedish army were followed up for fifteen years. Data on substance use at the time of conscription were available and psychiatric diagnoses for the fifteen years after conscription were obtained. A strong relationship between history of cannabis use at baseline and presence of schizophrenia at follow up was reported. The 'heavy' cannabis users (defined as at least 50 occasions of use) were six times more likely to have a diagnosis of schizophrenia at follow up than less frequent users or those who had never used cannabis. Significantly, no such associations were found for any of the other drugs used. The follow up to this study (Zammit, Allebeck, Andreasson, Lundberg & Lewis, 2002) reported that those who were 'heavy cannabis users' by the age of 18 were 6.7 times more likely to be diagnosed with schizophrenia. This result held even when the polysubstance users were excluded from the analysis and was reduced (but was still significant) when other confounds (low IQ, cigarette smoking, growing up in a city) were controlled for. The authors reported these results to be "consistent with a causal relationship between cannabis use and schizophrenia".

The results of the Swedish study have since been replicated in six more prospective cohort studies: two conducted in the Netherlands (Ferdinand et al, 2005; van Os et al, 2002), one conducted in Germany (Henquet et al, 2005), two in New Zealand (Arsenault et al, 2002; Fergusson, Horwood & Ridder, 2005) and one in Israel (Weiser, Knobler, Noy & Kaplan, 2002). The first Netherlands study (van Os et al, 2002) used data from the Netherlands Mental Health Survey and Incidence Study and followed 4045 people between 1996 and 1999. Participants with no psychotic disorder at baseline who were also cannabis users were at increased risk of clinically significant psychotic symptoms at the end of follow up (OR = 3.5-3.7). This association was independent of any comorbid non-psychotic psychiatric disorder or use of other substances at baseline. The second Netherlands study (Ferdinand et al, 2005) was a 14 year follow up of 1580 young adults in the 'Zuid Holland' study. In

this sample, cannabis use significantly predicted psychotic symptoms in participants who did not have psychotic symptoms before they began using cannabis (OR = 2.8). However, psychotic symptoms in those who had not used cannabis before the onset of psychotic symptoms also predicted future cannabis use (OR = 1.7). The German study (Henquet et al, 2005) followed 2437 young people aged 14 to 24 for four years between 1996 and 1999. Any cannabis use at baseline was reported to increase the risk of psychotic symptoms at the four year follow up in a dose-response fashion, regardless of confounders. The association was much stronger for those who had been identified as being prone to psychosis at baseline. Again, the relationship was significant even when the analysis was corrected for baseline use of other substances. Significantly, Henquet et al (2005) report an increased risk of cannabis use in those who had displayed psychotic experiences 3 to 4 years earlier and who had not used cannabis before (OR = 1.4). The first New Zealand study (Arseneault et al, 2002) was a birth cohort based on 1037 people born in Dunedin, New Zealand between 1972 and 1973. Cannabis use at age 15 and 18 increased the risk of presenting with psychotic symptoms or schizophreniform disorder at age 26 (OR = 11.4 for those who had used cannabis before the age of 15). Like the other cohort studies, this relationship was independent of the use of other substances. Significantly, this study also assessed the presence of psychotic symptoms at age 11 and was therefore able to demonstrate that the observed association between cannabis use and increased risk of psychosis was independent from pre-existing psychotic symptoms. The second New Zealand study (Fergusson et al, 2005) followed 1011 individuals taking part in the Christchurch health and development study from birth. Assessments were conducted annually until age 16 and then again at 18, 21 and 25. Those who were daily users of cannabis had rates of psychotic symptoms that were between 2.3 and 3.3 times higher than the rates for those who did not use cannabis. The study conducted in Israel (Weiser et al, 2002) was a population-based cohort of 50413 adolescent males aged 16 to 17. Those who were later hospitalised for schizophrenia were more likely to have smoked cannabis at baseline than those who were not hospitalised (adjusted OR = 2.0)

A Greek study (Stefanis et al, 2004) conducted a cross sectional analysis of data from an existing cohort involving 3500 representative 19-year olds. Cannabis use was associated with both positive and negative dimensions of psychosis. First use of

cannabis below 16 years of age was associated with a much stronger effect than first use after age 16 years, independent of life-time frequency of use.

Research on non-clinical samples has shown a relationship between cannabis use and psychosis proneness or schizotypy (e.g. Barkus, Stirling, Hopkins & Lewis, 2006; Dumas et al, 2002; Verdoux et al, 2003; Williams, Wellman & Rawlins, 1996). Recently, Verdoux et al (2003) used the experience sampling method (ESM) to assess the temporal relationship between cannabis use and psychotic experiences over a one week period. ESM is a diary technique which uses a signalling device, usually a watch, to alert participants to fill out self reports when an alarm sounds and provides a representative sample of moments in a person's daily life (De Vries, 1992). Participants with high psychosis vulnerability were more likely to report abnormal perceptions and thought influence when they used cannabis. Barkus et al (2006) found that cannabis use per se was not related to schizotypy in their sample of healthy volunteers but that high scoring schizotypes were more likely to report psychosis-like experiences and unpleasant after-effects associated with cannabis. Kwapil (1996) conducted a 10 year follow up of a high risk sample and reported psychosis proneness to be predictive of substance use. Not all studies involving psychosis prone people have reported an association between cannabis use and psychosis, however. A 12 month prospective study of high risk individuals (Phillips et al, 2002) did not find cannabis use at baseline to be associated with the onset of psychosis but there were low levels of substance use in their sample.

Although the evidence from the prospective cohort studies seems to suggest a causal link between cannabis use and psychosis we know that most people who smoke cannabis do not go on to develop schizophrenia and in countries where there has been a documented increase in rates of cannabis use in the general population (e.g. Australia) there has not been a corresponding increase in rates of schizophrenia (Degenhardt, Hall & Lynskey, 2003). If the relationship between cannabis and psychosis is indeed causal but not all cannabis users go on to develop psychosis then we must consider the possibility that some individuals are more vulnerable to the effects of cannabis than others. Van Os et al (2005) suggest a gene-environment interaction, with some individuals being genetically vulnerable to the effects of cannabis. Caspi et al (2005) tested this hypothesis in a longitudinal birth cohort study

and found that a functional polymorphism of the catechol-O-methyltransferase (COMT) gene moderated the influence of adolescent cannabis use on adult psychosis: Carriers of the COMT valine^{158} allele were more likely to experience psychotic symptoms after cannabis consumption than carriers of the COMT methionine allele. Recent experimental work also supports this link. Henquet et al (2006) exposed patients with a psychotic disorder and their relatives to delta-9-tetrahydrocannabinol in a double-blind placebo controlled study and found that carriers of the valine allele were most sensitive to Δ-9-THC induced psychotic experiences. Significantly, this finding was conditional on pre-existing psychosis liability.

Alcohol and Psychosis

Studies have shown alcohol dependence to be predictive of psychotic experiences in the general population (e.g. Johns et al, 2004; Tien & Anthony, 1990) but not alcohol use per se. There is some evidence that patients with psychotic symptoms are more likely to abuse alcohol than those who do not have psychotic symptoms (e.g. Olfson et al, 2002) but it is generally accepted that although alcohol abuse may worsen the symptoms of those with schizophrenia and precipitate relapse it does not actually cause schizophrenia (Bernadt & Murray, 1986; Hambrecht & Hafner, 1996). Given that alcohol is reported to be the most commonly used substance by people with schizophrenia (Regier et al, 1990) this may limit the significance of models of drug-induced schizophrenia (Mueser et al, 1998).

Amphetamines and Psychosis

The phenomenon of brief amphetamine-induced psychosis is well documented but the extent to which amphetamine use contributes to schizophrenia is not known. Baker et al (2004) found a high rate of mental health problems among regular amphetamine users. More than a quarter (26.7%) of those with mental health problems were diagnosed with psychosis and the majority of these (71.4%) reported that they had received this diagnosis after commencing regular amphetamine use. Dawe, Saunders, Kavanagh & Young, 2005 reported that 20% of injecting methamphetamine users had had a psychiatric admission but that for 43% of these the admission was *prior* to the onset of regular amphetamine use. Chen et al (2003) investigated 445 amphetamine users and found that amphetamine users with

psychosis were younger when amphetamine use was first initiated and used larger amounts of amphetamines than those without psychosis. They conclude that pre-morbid schizotypal personality predisposes amphetamine users to psychosis. Curran, Byrappa & McBride, (2004) systematically reviewed 54 studies investigating stimulants and psychosis and found that a single dose of a stimulant drug could produce a brief increase in psychosis ratings in 50-70% of participants with schizophrenia and pre-existing acute psychotic symptoms. Those with schizophrenia who do not have acute psychotic symptoms respond, but less frequently (30%). Thus, individuals who are already experiencing psychosis are more likely to have a psychotic reaction to stimulants. However, there is little evidence to suggest that stimulant use results in chronic psychosis or schizophrenia.

Cocaine and Psychosis

As with amphetamines, a number of studies have reported that cocaine can induce psychotic symptoms in some users but comparatively little research has been conducted to date. Brady, Lydiard, Malcolm & Ballenger (1991) interviewed 55 individuals consecutively admitted for treatment of cocaine dependence. Fifty-three percent (29/55) reported that they had experienced transient cocaine-induced psychosis. Floyd, Boutos, Struve, Wolf & Olivia (2006) assessed 51 cocaine dependent subjects and found that 36 (71%) had experienced psychotic symptoms during cocaine use. However, all participants in the study were polysubstance users.

Opiates and Psychosis

Research into the relationship between opiate use and psychosis is limited. Studies have generally shown a low comorbidity rate between opiate use and psychosis (Brooner, King, Kidorf, Scmidt & Bigelow, 1997; Dalmau, Bergman & Brismar, 1999; Margolese et al, 2004; Schneier & Siris, 1987) and there is evidence to suggest that heroin users may actually be at *lower* risk of psychosis than users of other substances (Farrell et al, 2002). Thus the available data do not appear to support the hypothesis that opiate use causes schizophrenia

It is clear that large numbers of patients presenting to mental health services for the first time are already using substances. The evidence from prospective longitudinal studies suggests that for some patients at least, cannabis can have a causal role in the

development of psychopathology. However, there is little evidence to suggest that other substances, including alcohol, are a causative factor in psychosis.

1.4.2. Does psychosis cause substance use?

The most well known model which states that substance use disorder is a consequence of psychiatric problems is the self-medication hypothesis (Khantzian, 1985; 1997) and it is this model that has received the most attention in the research literature, perhaps because of its intuitive appeal. The model proposes that substance abuse is an attempt to self-medicate psychiatric symptoms. It assumes that people with mental health problems use substances to reduce their symptoms and that problematic use develops as a result. The hypothesis suggests that substances are not chosen at random. Rather, there is selective matching of specific substances with specific symptoms. As Khantzian (1985) states: *"The drugs that addicts select are not chosen randomly. Their drug of choice is the result of an interaction between the psychopharmacologic action of the drug and the dominant painful feelings with which they struggle"* (p. 1259). The theory applies not just to the positive symptoms of severe mental illness (i.e. hallucinations and delusions) but also the negative symptoms. Variants of the self medication model postulate that drugs and alcohol are also used to self medicate extrapyramidal symptoms caused by neuroleptic medication (Schneier & Siris, 1987) or to alleviate dysphoria. Dixon et al (1991) go as far as to suggest that dysphoria might actually be the common factor underpinning increased comorbidity. *"Perhaps only those patients whose symptoms (positive, negative or extrapyramidal) lead to distress or depression are the ones who abuse drugs"* (Dixon et al, 1991, p. 75).

According to Mueser et al (1998) three types of evidence would provide support for the self medication hypothesis: (1) if epidemiological studies suggested that clients with particular psychiatric diagnoses were more prone to abusing specific types of substances, (2) if psychiatric clients with more severe symptoms were more likely than less symptomatic clients to abuse substances and (3) if clients with dual disorders described beneficial effects of substance use on symptoms.

Empirical data do not suggest a consistent relationship between substance use and specific diagnoses. The review by Schneier & Siris (1987), for example, reported that

patients with schizophrenia prefer drugs which counteract negative symptoms (e.g. cocaine, amphetamines and cannabis) to those which have predominantly sedative effects (e.g. opiates and alcohol) and that people with schizophrenia were more likely to use stimulants than those with different diagnoses. Similarly, Dixon et al (1989) found that patients with schizophrenia preferred activating drugs (e.g. cocaine, cannabis, stimulants and hallucinogens) whereas bipolar patients preferred sedative/hypnotics and alcohol. In contrast, Regier et al (1990) and Mueser et al (1992) found that the patterns of use observed by people with schizophrenia is similar to that found in patients with other diagnoses. Mueser et al (1992) suggest that it is the availability of different types of substances rather than their subjective effects that determine which substances are abused.

A number of studies have attempted to assess the link between severity of symptoms and levels of substance use but again, the evidence to date has been contradictory. Brunette, Mueser, Xie & Drake (1997) and Dervaux et al (2001) found no relationships between severity of symptoms and substance abuse whereas Pencer and Addington (2003) reported that substance use was associated with more severe positive symptoms. Recently, Talamo et al (2006) tested the hypothesis that comorbid patients had more positive versus negative symptoms than non-comorbid patients by conducting a meta analysis of 8 previously published cross sectional studies (n = 725) and found that comorbid patients had significantly higher positive symptom scores and significantly lower negative symptoms scores (assessed using the Positive and negative symptom scale, PANSS, Kay, Fiszbein & Opler, 1987). Chapman, Labhart & Schroeder (1996) found that alcohol users had a higher PANSS composite score: those who were currently abusing alcohol had an overall greater severity of positive relative to negative symptoms. Scheller-Gilkey, Moynes, Cooper, Kant & Miller (2004) compared the PANSS scores of schizophrenia patients with a history of substance against those with no such history and found no differences in either the positive or negative symptom scales. However, patients with a history of substance abuse had significantly higher general psychopathology scale scores. Comorbid patients displayed more somatic concern, guilt feelings, depression and poorer impulse control.

The self report literature

We reviewed the literature to identify articles containing self reported reasons for substance use. Studies for review were identified following a search for combinations of the key words schizophrenia, psychosis, dual diagnosis, comorbidity, drug use, drug abuse, substance use, substance abuse, alcohol use, alcohol abuse in two main abstract databases: PsycINFO (the American Psychological Association's abstract database) and PubMed (published by the U.S. National Library of Medicine). In addition, the bibliographies of articles were examined in order to identify further citations. English language studies that asked patients with psychosis to report their *current* reasons for substance use were included. Thirteen studies were identified. Two of these summarised their findings without reporting the numbers of patients endorsing each reason for use and were therefore excluded.

Table 1 contains the remaining eleven studies. Reasons for use were grouped into five main categories: intoxication effects, social reasons, dysphoria relief, psychotic symptoms and medication side effects. As the table shows, there is considerable variability between studies. Between 35 and 95% endorsed the intoxicating effects of drugs and alcohol as a reason for their consumption ('to get high', 'for the buzz', 'to feel good'). Between 8 and 81% endorsed social reasons ('to get on with others better', 'to fit in with the crowd'). Between 2 and 86% reporting using drugs and/or alcohol to relieve dysphoria (feelings of depression, anxiety, depression and other negative emotional states). Between 0 and 42% used drugs and/or alcohol to either alleviate or cope with the symptoms of psychosis (hallucinations, feelings of suspicion and paranoia) and between 0 and 48% reported using substances to reduce or cope with medication side effects. A range of 'enhancement' reasons for use were also endorsed in five of the studies (Addington & Duchak, 1997; Dixon et al, 1991; Goswami, Mattoo, Basu & Singh, 2004; Gregg, Haddock & Barrowclough, submitted for publication; Warner et al, 1994). These studies reported that patients use drugs and or alcohol to 'increase pleasure' (62-95%); 'to feel more energetic' (24 – 56%); 'to increase emotions' (13 – 49%), 'to talk more' (18 – 61%) and to improve concentration (13 – 33%).

Some of the apparent variability in reported reasons for use will be attributable to differences in sampling and in methodology. Not all patients included in these studies actually met criteria for a substance use disorder; some were merely substance 'users'. Some studies required patients to select their reasons for use from predetermined lists whilst others used free response or open ended questions. Some requested patients to list all of the reasons they used substances for whilst others requested only the 'main' reason. Significantly, none of the studies outlined employed self report methods with known validity and reliability for this patient group. Additionally, these studies have failed to examine reasons for use in the context of the known demographic risk factors such as age and gender. Do males report different reasons for use to females? Are younger patients with schizophrenia more likely to report certain reasons for substance use? What other factors (both illness-related and demographic) influence self reported reasons for use? Nevertheless, despite their shortcomings, the evidence from these self report studies provides some support for the self medication hypothesis, in particular the 'alleviation of dysphoria' version of the hypothesis. In the majority of studies, the most frequently endorsed reasons for use are from this category. Interestingly, some of the studies report that for some patients, their stated reasons for substance use and their outcome expectancies for the effects of that substance are incongruous with the actual achieved effect. For example, in Addington and Duchak's (1997) study, participants reported using drugs to increase pleasure, to get high and to reduce depression. However, subjective effects of increased depression and positive symptoms were also reported. Some patients may report using drugs and alcohol to make them feel better yet report feeling worse afterwards.

Table 1. Self reported reasons for use by substance users with psychosis

Authors	**Sample**	**Methodology**	**Reasons for use**				
			Intoxication effects *(to get high, to feel good)*	Social enhancement *(to facilitate social interaction/ to fit in)*	Dysphoria relief *(to relieve anxiety/ depression/ boredom; to relax)*	Psychotic symptoms *(to alleviate/cope with hallucinations/ feelings of suspicion/paranoia)*	Medication side effects
Test et al (1989)	27 drug and/or alcohol users with schizophrenia or schizoaffective disorder	Free response and inspection of a list	-	44.4%	44.4 - 63%	7.4%	18.5%
Dixon et al (1991)	53 drug and/or alcohol users with schizophrenia, schizoaffective or schizophreniform disorder	Questionnaire (‘Stated reasons scale, SRS’ developed for the study)	72%	55%	64 - 72%	4 - 11%	15%
Warner et al (1994)	55 drug and/or alcohol users with schizophrenia, schizoaffective or bipolar disorder	Interview (adapted from Test et al, 1989)	-	72.7%	47.3 - 61.8%	10.9%	72.7%
Addington & Duchak (1997)	41 drug and/or alcohol users with schizophrenia	Questionnaire (SRS, Dixon et al, 1991)	Alcohol 74% Cannabis 95%	Alcohol 56% Cannabis 71%	Alcohol 71 - 82% Cannabis 81%	Alcohol 24 - 29% Cannabis 19 - 40%	Alcohol 24% Cannabis 38%

(continued)

Table 1. *(continued)*

Authors	Sample	Methodology	Reasons for use				
			Intoxication effects *(to get high, to feel good)*	Social enhancement *(to facilitate social interaction/ to fit in)*	Dysphoria relief *(to relieve anxiety/ depression/ boredom; to relax)*	Psychotic symptoms *(to alleviate/cope with hallucinations/ suspicion/paranoia)*	Medication side effects
Fowler et al (1998)	194 drug and/or alcohol users with schizophrenia	Interview.	Alcohol - Cannabis 41% Amphetamine 79%	Alcohol 58% Cannabis 58% Amphetamine -	Alcohol 58% Cannabis 62% Amphetamine 47%	0 – 9%*	
Gearon et al (2001)	25 drug and alcohol users with schizophrenia or schizoaffective disorder	Questionnaire (Inventory of Drug Taking Situations (Annis et al, 1997); 'Self medication questionnaire' developed for study	-	48 - 68%	28 - 56%	36%	48%
Baker et al (2002)	160 drug and/or alcohol using psychiatric inpatients	Interview.	Alcohol 35.2% Cannabis 56.9% Amphetamine 44%	Alcohol 14.3% Cannabis 8.8% Amphetamine 8%	Alcohol 47.3% Cannabis 19.6% Amphetamine 36%	0 – 2.2%*	

(continued)

Table 1. *(continued)*

Authors	Sample	Methodology	Reasons for use				
			Intoxication effects *(to get high, to feel good)*	Social enhancement *(to facilitate social interaction/ to fit in)*	Dysphoria relief *(to relieve anxiety/ depression/ boredom; to relax)*	Psychotic symptoms *(to alleviate/cope with hallucinations/ feelings of suspicion/ paranoia)*	Medication side effects
Goswami et al (2004)	22 male drug and alcohol users with schizophrenia	Questionnaire Modified SRS (Dixon et al, 1991)	81%	23%	35 - 54%	42%	12%
Green et al (2004)	45 male cannabis users with psychosis	Telephone interview	-	37.8%	2.2 – 26.7%	0%	0%
Schofield et al (2006)	49 cannabis users with psychosis	Questionnaire (SRS, Dixon et al, 1991)	-	81%	49 - 86%	8 - 11%	15%
Gregg et al (submitted)	45 drug and alcohol users with schizophrenia or schizoaffective disorder	Q Methodology	51.1%	71.1%	60- 77.8%	26.7 - 31.1%	4.5%

** These studies combined illness related and medication related reasons for substance use*

Are some people with schizophrenia 'supersensitive' to the effects of substances?

An alternative secondary substance use model is the supersensitivity model (Mueser, Drake and Wallach, 1998) which hypothesises that certain individuals with schizophrenia have biological and psychological vulnerabilities that are a result of genetic and early environmental effects in their lives: These vulnerabilities can interact with stressful life events to cause psychiatric disorder. Substance use is believed to increase this vulnerability so that people with schizophrenia are more likely to experience negative consequences as a result of substance use than people in the general population. Furthermore, these negative consequences result from lower levels of use than those needed by the general population (Drake et al, 1989; Drake & Wallach, 1993). In short, these individuals are "supersensitive" to the effects of certain substances. According to the hypothesis, dually diagnosed individuals should be more likely to be diagnosed with a substance abuse as opposed to a substance dependence diagnosis and experience greater negative consequences associated with lower levels of use when compared to substance users without schizophrenia. The first empirical test of the hypothesis has recently been conducted. Gonzalez, Bradizza, Stasiewicz & Paas (2006) compared 42 individuals with substance use disorder (SUD) to 53 dually diagnosed individuals (DD). Although the DD group had significantly greater levels of psychological symptoms they did not experience greater negative consequences. Rates of substance use were comparable between the two groups and the DD group had higher proportions of individuals meeting substance use dependence criteria.

1.4.3. Do substance use and psychosis share a common origin?

Common factor models propose that substance use and schizophrenia share a common origin. These common factors could be biological, individual or social. There is a good deal of evidence to suggest that genetic factors independently contribute to schizophrenia (e.g. Gottesman & Shields, 1976) and to substance use disorder (e.g. Rhee et al, 2003; Tsuang, Bar, Harley & Lyons, 2001) although it is not clear which genes are involved and how genetic predisposition is transmitted. The extent to which the two disorders share a common genetic vulnerability, however, is unknown. The main method of assessing the role of genetic factors in the co-development of schizophrenia and substance use disorder has been to examine family history but the studies that have been conducted to date have been conflicting.

For such a link to be supported studies would be expected to find that patients with schizophrenia have more relatives with substance use disorders than people in the general population or that people with substance use disorder would be more likely to have family members with schizophrenia. Whilst some studies have reported that dually diagnosed patients are more likely to have family members with substance use disorders than patients with schizophrenia alone (e.g. Noordsy, Drake, Biesanz & McHugo, 1994) other studies have not found this to be the case (Gershon et al, 1988). It is possible that genetic vulnerability may contribute to the development of comorbid substance use in some patients but the available evidence does not appear to support the idea that increased comorbidity is a result of a common genetic basis for both disorders.

Another common factor that could potentially influence both substance use and schizophrenia is neuropathology i.e. that the neuropathology of schizophrenia impacts on the neural circuitry mediating drug reward and reinforcement resulting in an increased vulnerability to addictive behaviour. Put simply, patients with schizophrenia might be biologically vulnerable to the rewarding effects of drug abuse. The dopamine opioid neurotransmission systems have been implicated. In these models schizophrenia and substance use are thought to be independent manifestations of the same disease. (See Chambers et al, 2001 for a review).

These results may actually imply a common underlying vulnerability for both disorders in which the pathology of the cannabinoid system in schizophrenia patients is associated with both increased rates of cannabis use and increased risk for schizophrenia (Weiser and Noy, 2005). Further research is needed to determine the relevant underlying neuropathological processes before firm conclusions can be drawn.

Social and environmental factors that could potentially underpin both disorders have also been hypothesised, for example family dysfunction (Fergusson, Horwood & Lynskey, 1994) and economic and social disadvantage. Another possible mechanism is traumatic early childhood experience. We know that members of the general population who report physical or sexual abuse in childhood are more likely to abuse substances in adulthood (Kessler, Davis & Kendler, 1997) and that for some,

childhood abuse can also contribute to psychosis (Briere, Woo, McRae, Foltz & Sitzman, 1997). Scheller-Gilkey et al (2004) compared 70 patients with schizophrenia and a history of substance abuse with 52 patients without a history of substance abuse and found that the former had significantly higher scores on a measure of childhood traumatic events and on a PTSD scale. The available evidence suggests that the relationship may be bidirectional: PTSD precedes the onset of substance use in some people with schizophrenia but may also put people with schizophrenia at increased risk of subsequent retraumatisation. Mueser et al (1998) present evidence suggesting that ASPD and its childhood correlate conduct disorder might be a common factor. Studies have shown that patients with schizophrenia and antisocial personality disorder (ASPD) are more likely to have comorbid substance use disorder than patients without ASPD (Caton et al, 1994; Mueser et al, 2000) and for patients with schizophrenia and substance use disorder ASPD is associated with a more severe course of substance use disorder including earlier age of onset and larger quantities of substance use (Mueser, Drake et al, 1997).

Impairments in cognitive functioning have also been hypothesised to have an impact (Tracy, Josiassen & Bellack, 1995), as have poorer coping skills, lower educational attainment, lower socioeconomic status, poor interpersonal and social problem solving skills. It must be noted that it is unlikely that any of these cognitive and social risk factors operate independently to increase rates of comorbidity but their cumulative effects might. Few multiple risk factor models have been proposed but the cross sectional literature does seem to suggest that some of these factors may play a part.

1.4.4. Do psychosis and substance use interact and maintain each other?

Bidirectional models propose that psychosis and substance use problems may both trigger and maintain each other. For example, substance use may serve as a stressor precipitating onset of schizophrenia in vulnerable individuals and mental health problems are then subsequently maintained by continued substance use due to socially learned cognitive factors such as beliefs, expectancies and motives for substance use (Mueser et al, 1998). Thus bidirectional models tend to involve multiple risk factors but although a variety of different models have been proposed there have been no empirical investigations.

Multiple risk factor models

Blanchard et al (2000) proposed an affect regulation model of substance which in common with the self medication literature suggests that patients with schizophrenia use drugs and alcohol to cope with negative emotions and problems. The proposed model emphasises the role of enduring personality characteristics stating that stable personality traits, stress and coping are the factors underlying long term risk for substance use. Aspects of this model find some support in the literature: The self report literature shows that people with schizophrenia report using substances to regulate negative affects such as dysphoria and anxiety and a handful of empirical studies have shown that substance use is related to personality components in patients with schizophrenia (e.g. Blanchard et al, 1999; Dervaux et al, 2001; Kwapil, 1996).

Barrowclough et al (2007) propose a model of substance use maintenance in psychosis which incorporates the key features of Marlatt and Gordon's social-cognitive model of addiction (Marlatt & Gordon 1985). The model proposes that certain situations and cues trigger drug or alcohol related thoughts which in the absence of alternative coping strategies and in the context of low self efficacy for resisting use and positive expectancies from use make the person vulnerable and more likely to use substances. This interaction between situations and cognitive/emotional reactions becomes the basis of a repeated cycle which maintains drug or alcohol use. As the self report literature outlined above shows, people with schizophrenia indicate that situations and cues triggering use may be related to psychotic symptoms and to the negative consequences of the disorder, particularly dysphoria and distress.

Studies have shown that people with schizophrenia often experience difficulty in coping with stresses (Corrigan & Toomey, 1995; Mueser, Drake et. al., 1997; Mueser, Valentiner & Agresta, 1997) and that they may possess a relatively limited repertoire of coping strategies (Rollins, Bond & Lysaker, 1999). A number of studies have investigated coping in relation to psychotic symptoms (e.g. Falloon and Talbot, 1981; Kinney, 1999; Lobban, Barrowclough & Jones, 2004), affective symptoms (e.g. Brier & Strauss, 1983) and negative symptoms (e.g. Mueser, Drake et al, 1997;

Rollins et al, 1999) in patients with schizophrenia. Such studies have highlighted that individuals with schizophrenia use a diverse range of strategies to influence symptoms. People with schizophrenia use mainly avoidant coping strategies and tend to have a greater array of coping strategies for positive symptoms than for negative symptoms (Rollins et al, 1999). From the perspective of social learning theory (e.g. Bandura 1977) both drug and alcohol use are seen as habitual maladaptive coping responses employed by people who hold positive beliefs about the effects of that substance, coupled with inefficient coping resources (Abrams and Niaura 1987). According to this perspective, deficiencies in general coping skills and positive expectancies about the effects of drug and alcohol operate independently and jointly to contribute to the use of drugs or alcohol as a coping mechanism. Substance use could be viewed as a general coping mechanism invoked in situations where more appropriate coping responses are either unused or not available. Social learning theory assumes that the coping functions of a substance are learned through initial exposure to that substance and in subsequent use in different situations, hence the salience of particular functions should show considerable variation across individuals (Wills and Hirky, 1996).

1.5. Summary and Conclusions

We have presented a review of the main models that have been proposed to explain the etiological relationship between substance use and psychosis. Although these four models have no doubt served to clarify our understanding of the reasons for substance use by people with schizophrenia, it is clear that no single model is able to adequately explain all comorbidity. The hypothesis that substance use causes schizophrenia is not supported sufficiently or consistently. Evidence from recent prospective cohort studies suggests that cannabis can have a causal role in the development of psychopathology and studies involving psychosis prone individuals indicate that cannabis use might precipitate psychosis among vulnerable individuals but there is little evidence to suggest that other substances, including alcohol, are a causative factor in psychosis. The literature provides little support for the self medication hypothesis in its original formulation i.e. that specific substances are chosen for their specific pharmacological properties. The self report studies do show that some people with schizophrenia report using substances in an attempt to alleviate specific psychopathological symptoms or medication side effects but there

has been little research to show whether substances are selected differentially. There is greater support for an 'alleviation of dysphoria' model of comorbidity than Khantzian's (1985) original self medication formulation: patients report using substances to alleviate or to cope with unpleasant affective states (e.g. boredom, depression, anxiety and loneliness). Common factor models have implicated both genetics and neuropathology but no common gene has yet been identified and the neurobiological evidence is not consistent. Additional research is required. It may even be the case that some other as yet unresearched variable or variables may account for the relationship between substance use and schizophrenia.

It is likely that there are multiple risk factors involved in substance use in psychosis. We know that a number of demographic factors (such as age, gender and socioeconomic status) and contextual factors (such as family history of substance use) predict substance use in schizophrenia. Social networks, quality of living environment, poverty and stressful life events influence substance use as do individual differences in personality, coping, interpersonal skills and social functioning but the extent to which these explain increased comorbidity is not known: there are few well developed multiple risk factors models. More work to develop and test multiple risk factor models is required.

Bidirectional models integrating aspects of the different causative models outlined in this review suggest that separate factors may be responsible for the initiation and maintenance of substance use by people with schizophrenia. It is possible, for example, that substance users whose drug use precipitated or caused their schizophrenia (perhaps because of biological vulnerability) may continue using cannabis in order to alleviate or cope with the symptoms of schizophrenia better. As yet, however, there have been no empirical investigations of bidirectional models. Longitudinal prospective cohort studies would be ideally placed to identify the factors related to the development and maintenance of substance use and psychosis and the factors which mediate and moderate the paths between the two. Such studies would also allow for the causal hypotheses to be tested. The existing longitudinal research is constrained by a failure to assess the predictive impact of substances other than cannabis on psychosis and has largely ignored the relationships between current symptomatology, substance use and other potential risk factors.

The dually diagnosed population is a heterogeneous group and as Mueser et al (1998) suggest, it is likely that different models may account for comorbidity in different groups of people and multiple models may apply for some individuals. The challenge now it is to identify which models apply to which people if we are to be able to develop more effective treatments.

Chapter 2

Methods

The following section details the design of the five empirical studies that make up the thesis; the power calculations that informed recruitment and the recruitment procedures employed. The inclusion and exclusion criteria are described as are the key assessment measures used. The section concludes with a summary of the main ethical considerations. More details about the methods employed and methodological limitations can be found in the individual papers and in the general discussion (chapter 8).

2.1. Design

Four of the five empirical studies reported in this thesis (chapters 3, 4, 5, and 6) utilised cross-sectional designs to test the main study hypotheses. Cross sectional designs do not allow us to make causal inferences but they are nonetheless an important first step in assessing whether hypothesised relationships do actually exist before carrying out prospective studies on larger samples. Study one (chapter 3) utilised Q methodology (Stephenson, 1953) to examine reasons for substance use in a sample of people with psychosis. Q methodology involves the sorting or ranking of statements (in this case reasons for use) which decreases the likelihood of the biased response patterns associated with more traditional questionnaire studies. It was selected primarily because of its suitability for use with people who may find it difficult to articulate a consistent rationale for their behaviours. Results from this study were used to inform the development of a new reasons for substance use questionnaire (the Reasons for Substance Use in Schizophrenia questionnaire, ReSUS) which was tested and validated in a large clinical sample (Study 2, Chapter 4). The majority of participants in this study came from a large randomised controlled trial investigating the efficacy of combined motivational interviewing and cognitive behavioural therapy in people with psychosis and comorbid substance use disorders (Barrowclough et al, 2009) details of which are described below.

Study three (chapter 5) examined the psychometric properties of the ReSUS questionnaire in an analogue student sample and provided an opportunity for a preliminary test of the hypothesised model of substance use. The decision was made

to include an analogue sample because it was clear that it would be difficult to recruit a patient sample that would be sufficiently large to test the hypothesised substance model with adequate power (see power calculation in section 2.2. below). Research has shown that rates of substance use by students at UK universities are high (Webb, Ashton, Kelly & Kamali, 1996) and we anticipated a good response to an online survey based on response rates to earlier studies conducted at the University of Manchester. Scales assessing schizotypy, which is a vulnerability marker for psychosis, were included as proxy symptom measures. A number of previous studies have used self report measures of schizotypy in non-clinical samples to investigate the link between substance use (particularly cannabis) and proneness to psychosis to good effect (Dumas et al, 2002; Moss, Bardang, Kindl, & Dahme, 2001; Williams, Wellman, & Rawlins, 1996). Study four (chapter 6) uses structural equation modelling (SEM) to test and further refine the hypothesised model of substance use in a clinical sample. Participants were a subsample of the people whose data contributed to chapter four.

The final empirical study (chapter 7) investigated the temporal relationship of cannabis use to mood and symptoms in daily life using a prospective experience sampling design (experience sampling methodology, ESM) in which participants were repeatedly prompted to report on cannabis use, mood states and psychopathology over a one week period. ESM has the advantage of avoiding retrospective assessment of both substance use and psychopathology which may be subject to recall bias.

2.2. Sample size

Studies involving Q methodology require fewer participants than traditional questionnaire based studies because Q studies examine the number of different points of view in circulation (the Q factors) and the goal of any Q study is for all factors to be well defined. Brown (1980) defines this as having each factor defined by four to five Q sorts, with each having a substantial loading on that factor only. He suggests that this number gives us a good estimation of the perspective that the factor represents and additional Q sorts beyond these four to five superfluous: "*What is of interest ultimately are the factors with at least four or five persons defining each; beyond that, additional subjects add very little.*" (Brown, 1980, p.260). Because we

could not know in advance how many factors there were or which individuals would be affiliated with each of the factors we compensated by oversampling as Brown recommends. Based on previous research involving motivations to use substances in nonclinical populations (e.g. Cooper 1994; Cooper, Frone, Russell, & Mudar, 1995) we anticipated that ten or less factors would emerge from our study and aimed to recruit 4-5 participants for each factor (i.e. 50 participants).

Power calculations were used to estimate the numbers needed for the studies reported in chapters 4, 5 and 6: Each study hypothesised associations between symptoms, substance use and reasons for substance use. The Reasons for Substance use (ReSUS) questionnaire was not developed at the point at which these studies were designed and the power calculation was therefore based on the level of symptoms observed in previous research with substance using populations (Barrowclough et al, 2001; Cantwell, 2003; Barrowclough, Ward, Wearden, & Gregg, 2005). A sample size of 85 participants would give 80% power to identify correlations of 0.3 as significant at the .05 level.

As the research involved the development of a new questionnaire measure it was necessary to ensure that there would be enough participants to conduct a factor analysis. As a rule of thumb (Floyd & Widaman, 1995) a measure should be administered to roughly five times the number of participants as items. With 40 items in the ReSUS questionnaire, 200 participants would be needed for the factor analysis. To assess test-retest reliability we calculated that if twenty participants completed the measure a second time there would be enough participants to show a sufficient absence of disagreement. A paired t-test on the two sets of factor score values would have 80% power to detect differences of 0.66 standard deviations. In addition, the total agreement % relating to individual items would be estimated to within +/- 17.5%

For the experience sampling study (chapter 7) we planned to investigated the main effect of cannabis use on psychosis outcome, and also interaction effects of cannabis*group on psychosis outcome and hypothesised small (0.3) effect sizes. Thirty in each group would theoretically give 3600 observations (10 beeps a day for 6 days for 60 participants) however, because participants rarely complete all 60 beeps, the mean number of valid beeps in previous studies was used to calculate

power (38 out of 60 questionnaires completed; 2280 observations). Based on these figures the power to detect significant two-way interactions would be 81% and to detect main effects: 86%.

2.3. Recruitment procedures

Participants in study 1 (chapter 3) were recruited from four mental health trusts in Greater Manchester. Recruitment, which was conducted by the author, was via community mental health teams and assertive outreach teams and inpatient psychiatric wards. Care co-ordinators and ward staff were informed about the study and asked to approach potentially eligible participants on the behalf of the researcher. Service users who were interested in taking part were then visited by the researcher, provided with the study information sheet and given the opportunity to ask questions. Potential participants were given 24 hours to consider taking part before being asked to provide informed consent.

Study 2 (chapter 4) included 35 of the 45 participants who had taken part in study 1. The remainder (n = 195) were taking part in a clinical trial (Barrowclough et al, 2009) and were recruited from six mental health trusts in Greater Manchester, Lancashire and South London. Research Assistants were responsible for the majority of recruitment to this trial (190 of those included in study 2). The author also assisted with recruitment to the trial, recruiting 5 of those who took part in this study. As with study 1, potentially eligible participants were provided with the study information sheet and given 24 hours to consider taking part before being asked to provide informed consent. Potential participants were asked to complete a checklist of substances used and provide typical alcohol and drugs use in the past 3 months at the initial visit. Patients meeting inclusion criteria for levels of alcohol and/or illicit drug use completed the alcohol and/or drug sections of the Structured Clinical Interview for the DSM (First, Spitzer, Gibbon and Williams, 2002). If participants used more than one illicit drug, the assessment was administered for the drug perceived by the participant to be most problematic or if the person did not make such a distinction, the most frequently used. If dependence or abuse criteria were not met for this drug, the assessment was repeated for the next most problematic drug until criteria were met. Those not meeting DSM-IV dependence or abuse criteria for alcohol or an illicit drug were not eligible to participate in the trial.

Study 2 was an 'add on' study to the main trial and not all of the trial's participants were included: only those recruited or seen for their 12 month follow up between March 2006 (when the reasons for substance use questionnaire was finalised and added to the battery of assessments) and April 2007 (the end of the trial) were included. Eighty-two participants completed the assessment measures at baseline and 113 completed them at the 12 month follow up. The 82 baseline participants also make up the total sample of study 4 (chapter 6).

Recruitment to study 3 took place online, via an email from the author to the entire student body of the University of Manchester. Interested people were asked to follow a hyperlink to a printable information sheet. Because the study was completed online participants were not asked to sign a consent form. They were asked whether they agreed to participate and those who responded yes were directed to the questionnaire measures. It was assumed that participants who did not wish to participate would not complete the questionnaires.

Participants in studies 1-4 completed the Reasons for Substance Use in Schizophrenia (ReSUS) questionnaire with reference to their *main* substance: For clinical participants this was the substance they met DSM-IV abuse/dependence criteria for. For those who met DSM-IV abuse/dependence criteria for more than one substance, the main substance was identified as that perceived by the participant to be most problematic or, if the person did not make such discrimination, then the most frequently used. Participants in the student analogue study were asked to nominate their main substance according to frequency of use (the substance they had used most frequently in the preceding three months, or, if two or more substances were used with equal frequency, the substance that participants identified as being 'hardest to go without').

Participants in study 5 (chapter 7) were recruited by the author (n = 46) and a research assistant (n = 4). Clinical participants were recruited from four mental health trusts in Greater Manchester. Mental health key workers in community health teams were informed about the study and asked to identify potentially eligible participants. Again, potentially eligible participants were provided with the study information sheet, given the opportunity to ask questions and given 24 hours to consider taking part before being asked to provide informed consent. Non-clinical

participants (the student controls) were recruited via an advert placed on the University of Manchester's research volunteer notice board on the University's intranet pages. Interested students were asked to contact the author via email to make an appointment to determine eligibility for the study.

The care co-ordinators, consultant psychiatrists and general practitioners of all clinical participants in all studies were informed in writing once consent was obtained.

2.4. Inclusion and exclusion criteria

Inclusion criteria for the clinical participants were as follows: aged over 16 years; in current contact with mental health services; a current clinical diagnosis of non-affective psychotic disorder (ICD-10 and/or DSM-IV); no significant history of organic factors implicated in the aetiology of psychotic symptoms; English speaking; having a fixed abode (including B&B or hostel).

In addition, participants in studies 1, 2 and 4 were required to have a DSM-IV diagnosis of drug and/or alcohol dependence or abuse and participants in study 5 were required to meet DSM-IV criteria for dependence or abuse of cannabis. Participants also had to meet minimum levels of current substance use in four of the five studies: Participants in the clinical trial (studies 2 and 4, chapters 4 and 6) were required to exceed 28 units of alcohol for males, 21 units for females, on at least half the weeks in the past three months or be using illicit drugs on at least two days per week in at least half the weeks in the past three months. Participants in studies 1 and 3 (Chapters 3 and 5) were required to be using drugs or alcohol at least weekly and participants in study 5 (ESM study, chapter 7) were required to be using cannabis at least three times weekly. Participants were excluded from the ESM study if they met DSM IV criteria for a diagnosis of dependence on other substances. Student participants were also excluded if they had a past psychiatric history or were currently taking psychiatric medication.

2.5. Measures

This section briefly describes the key measures that were used to assess the key constructs in the research programme. Further details can be found in the individual

papers which also include some additional measures not included here. Copies of all the assessments detailed here can be found in the Appendices.

Reasons for substance use in schizophrenia (ReSUS, Gregg, Barrowclough & Haddock, 2009)

The ReSUS was developed as part of this programme of research. Details of the stages involved can be found in chapters three and four. The final version of the questionnaire consists of 40 items describing situations in which people drink alcohol/use drugs. Participants were asked to indicate whether they used their main substance in that situation "never", "sometimes", "often" or "almost always". Data from a clinical sample (chapter 3) revealed three subscales 'coping with distressing emotions and symptoms', 'social enhancement and intoxication' and 'individual enhancement/expansion' each of which was found to have good internal reliability (alphas were .91, .81 and .82 respectively). The questionnaire has two versions, one worded for drug users (ReSUS-D) and one for alcohol users (ReSUS-A), both self report. The items in each questionnaire are the same except for minor wording differences for example the following item from ReSUS-A "When I feel under pressure from other people to drink alcohol" appears as "When I feel under pressure from other people to use drugs" in ReSUS-D. The mean score for each subscale is used as the subscale score in all analyses.

The brief COPE (Carver, 1997)

The brief COPE was used to assess general coping strategies. The brief COPE is a shortened self report version of the original 60 item self report inventory developed by Carver, Scheier & Weintraub (1989). The brief cope yields fourteen distinct coping strategies. Respondents are asked to indicate the degree to which they typically utilise each coping strategy when confronted with stress on a four point scale (from 1 'I don't do this at all' to 4 'I do this a lot'). The subscales can be usefully grouped into three categories: 1) Problem focused coping, including active coping, planning and use of instrumental support; 2) Emotion focused coping, including positive reframing, acceptance and use of emotional support, humour and religious coping 3) dysfunctional coping, including behavioural disengagement, venting of emotions, denial, self distraction and self blame. Alphas for the three subscales are reported in the individual papers.

Timeline Followback (TLFB, Sobell & Sobell, 1992)

Data on current substance use behaviour (type and frequency of use over the preceding 90 days) was collected using the timeline follow back interview for participants in the clinical trial. The TLFB is administered by the researcher and uses an annotated calendar that is personalised for each participant. Significant events or regular patterns (e.g. 'pay day') are recorded on the calendar and the calendar then serves as a memory cue for participants as they try to recall daily alcohol and drug use. Another strategy used to prompt recall was identifying periods of abstinence. The researcher records, for each of the 90 days, the number of drinks consumed; the quantity (millilitres) and the strength of alcohol (which is later converted into alcohol units) and the type, amount (grams) and cost of the drugs consumed. Participants were instructed to be as accurate as possible but when recall was difficult they were instructed to provide their best guess. The following variables were derived from the completed calendars: i) days abstinent from main substance ii) days abstinent from all substances iii) units of alcohol consumed iv) cost of main substance used. The TLFB is the most well researched method of collecting retrospective self reports of daily substance use in both alcohol (Sobell & Sobell, 1992) and drug using populations (Fals-Stewart, O'Farrell, Freitas, McFarlin, & Rutigliano, 2000) and has been demonstrated to be reliable in a sample with serious mental illness (Carey, Carey, Maisto & Henson, 2004)

To provide collateral checks on participants' self reports of substance use, care co-ordinators also completed abbreviated Timeline Followback assessments (reports of patients' substance use per week during the previous 90 days). Additionally, 19% of trial participants gave hair samples which were analysed by a specialist hair analysis company (TrichoTech Ltd) to detect the presence of illicit drug use. These comparisons indicated adequate concurrent validity: The agreement between substances identified in hair samples and substances reported by the participant on the Timeline Followback was $\kappa = 0.67$. The mean agreement between patient Timeline Followback self reports and care co-ordinator abbreviated Timeline Followback reports was $\kappa = 0.62$. There were significant ($p<0.01$) associations between patient and care co-ordinator Timeline Followback reports, with intraclass correlation coefficients as follows: percent days abstinent from main substance, 0.67; units alcohol, 0.63; weight cannabis, 0.49. (Barrowclough et al, in press).

The two studies which used data derived from the timeline followback (studies 2 and 4, chapter 4 and 6) were cross-sectional in nature and only information about substances used in the previous 30 days was used.

Inventory of Drug Use Consequences (InDUC, Blanchard, Morgenstern, Morgan, Lobouvie, & Bux, et al, 2003)

Perceived adverse consequences of substance use were assessed using the 15 item self report version of the InDUC. Items on the InDUC are scored on a 4-point Likert scale from 0 (never) to 3 (daily or almost daily) with higher scores being indicative of more adverse life consequences resulting from substance use. Blanchard et al, (2003) provide evidence that InDUC items reflect one general consequence factor (alpha = .95) and the total score was therefore used in the majority of analyses using this measure.

Alcohol Use Disorders Identification Test (AUDIT, Saunders, Aasland, Babor, de la Fuente & Grant, 1993)

The AUDIT contains 10 questions about level of alcohol consumption, drinking behaviour and associated problems and can be used to identify people whose alcohol consumption has become hazardous to their health. Continuous AUDIT scores were used as an outcome measure in the hypothesised substance use model (studies 3 and 4). The AUDIT was also used to identify students who were drinking problematically in study 3, where only those who were drinking to hazardous levels were included. A cut off score of 6 or above indicates problematic drinking in student samples (Adewuya, 2005; Kokotailo et al, 2004).

Drug Abuse Screening Test (DAST, Skinner, 1982)

The 20 item DAST taps various drug use consequences that are combined in a total DAST score to yield a quantitative index of problems relating to drug use. This continuous score was also used as an outcome measure in studies 3 and 4. The DAST was also used to identify students with a probable drug use disorder in study 3 (a score of 5 or more).

The Positive and Negative Syndrome Scale (PANSS; Kay, Fiszbein, & Opler, 1987)

The PANSS was used to assess current symptomatology in the clinical samples. The PANSS is a 30 item semi-structured clinical interview which is used to assess

severity of positive symptoms, negative symptoms and general psychopathology in schizophrenia. Items are rated on 7-point Likert scales (0 absent – 7 severe) and severity is rated according to the degree of abnormal manifestation; frequency of occurrence and the degree to which the symptom impacts on everyday functioning. Scores are summed separately for each subscale and combined to provide a total severity score. The PANSS has good psychometric properties (Kay et al, 1987; 1988) and is used widely in psychological research with psychotic populations. The author and research assistants rated 10 'gold standard' Positive and Negative Syndrome Schedule video-recorded interviews prior to recruitment taking place. The mean intraclass correlation coefficients across all assessors indicated excellent inter-rater reliability: positive subscale, 0.89; negative, 0.85; general, 0.88; and total, 0.86.

The psychotic symptom rating scales (PSYRATS, Haddock, McCarron, Tarrier, & Faragher, 1999)

The PSYRATS were used to assess auditory hallucinations, delusions and distress in relation to both types of symptom. The PSYRATS are semi-structured researcher administered interviews which were administered as part of the PANSS interview assessment (auditory hallucinations as part of PANSS item P3 and delusions as part of PANSS item P1) in order to reduce participant burden. Items are rated on a 5 point scale (0-4) and higher scores indicate greater severity. The subscales have been shown to have good internal reliability and validity.

Calgary Depression Scale (CDSS, Addington, Addington & Schissel, 1990)

The CDSS was used to measure depression. The CDSS is a researcher administered structured interview designed to assess depressive symptoms separate from positive, negative and extrapyramidal side effects in people with schizophrenia. It contains 9 questions which are rated on a 4 point scale (0-3). Higher scores indicate more depressive symptomatology. These questions were also asked as part of the PANSS interview and were integrated into item G6.

The Global Assessment of Functioning scale (GAF, American Psychiatric Association, 1994)

The GAF scale was used to rate the psychosocial functioning of participants. The GAF is a researcher-rated index of social, occupational and psychological

functioning. Two subscales are scored: symptoms and disability. Scores range from 0 to 100 with lower scores reflecting a greater degree of impairment. Inter-rater reliability (total score) was good with an intra-class coefficient of 0.70.

2.6. Ethical considerations

The clinical studies were approved by the North West MREC (study one), and South Manchester Research Ethics Committee (study five), the relevant Trust Research and Development Departments and the University of Manchester Research Ethics Committee. Permission to include the ReSUS and COPE questionnaire measures in the MIDAS Trial (studies two and four) was granted by the Eastern MREC and the Trial's Steering Committee. The student analogue study (study three) was approved by the University of Manchester. Participants in all studies were provided with a participant information sheet before being asked to provide written consent to take part. Students in the analogue study were asked to provide consent by checking boxes online. (See appendix 13 for copies of the study information sheets and consent forms and the invitation emails sent to the students who took part in studies three and five). Participants in all studies were informed that their participation was voluntary and that they could withdraw at any time. Information sheets provided details of people to contact should participants become distressed during assessments and the researcher took care to be aware of the stress levels of the clinical participants taking part. Frequent breaks were offered and sessions terminated early or rescheduled if there was any sign of distress. Participants in the ESM study were contacted during the ESM week to check that they were still happy to take part and were advised to contact the researcher should they wish to return the signalling equipment and diaries before the ESM week was up.

All data collected were treated with confidence and in accordance with the Data Protection Act (1998). Participants were identified by unique code numbers and participants' details were stored separately to the data collected. The two student samples were completely anonymised once the data was collected and contact details destroyed in order to comply with the University's guidelines.

Participants in the ESM study were paid £15 each for taking part, regardless of whether all measures were completed. Participants in the online student study were entered into a prize draw for £75 for taking part.

Chapter 3

Self reported reasons for substance use in Schizophrenia: A Q methodological investigation

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Abstract

Background: Large numbers of people with a diagnosis of schizophrenia use drugs and alcohol, resulting in poorer symptomatic and functional outcomes for many.

Aims: To examine the reasons that people with a diagnosis of schizophrenia give for their own alcohol and drug use.

Method: Q methodology was used to examine reasons for use. Forty five people with a diagnosis of schizophrenia or schizoaffective disorder and comorbid substance misuse completed the sorting procedure.

Results: Analysis of the Q Sorts revealed three distinct groups of substance users:

(1) those who predominantly used for social and enhancement reasons, to 'chill out and have a good time with others'

(2) those who used to regulate negative affect and alleviate positive symptoms, to 'cope with distressing emotions and symptoms'

(3) those who used substances to augment themselves and intensify their experiences, to 'feel bigger, better and inspired'.

Conclusion: People with a diagnosis of schizophrenia who use substances explain their substance use in different ways. The identification of sub groups of users may be useful in the development of interventions aimed at reducing substance use in this group.

3.1. Introduction

Large numbers of people with psychosis use drugs or alcohol. Estimates of lifetime prevalence for individuals with schizophrenia are around 50% (Regier et al, 1990) and rates of current use as high as 75% have been reported (Ananth et al, 1989). This comorbidity has profound implications for the course and treatment of schizophrenia. There is evidence to suggest that people with schizophrenia who use drugs and alcohol have poorer outcomes than their non substance using counterparts (for example Margolese et al, 2004; Menezes et al, 1996) and studies have shown that even relatively minor use can have an adverse impact (Drake, Osher & Wallach, 1989; Mueser, Drake & Wallach, 1998). Substance use has been associated with higher rates of treatment noncompliance (Janssen et al, 2006; Owen et al, 1996); more positive symptoms (Pencer & Addington, 2003) and more relapses and hospitalisations (Linszen, Dingemans & Lenior, 1994; Swofford et al, 1996). Other negative consequences of substance use include increased rates of suicidal ideation (Bartels, Drake & McHugo, 1992; Kamali et al, 2000); increased aggression and violence (Cuffel et al, 1994; Fulwiler et al, 1997) and higher rates of homelessness and housing instability (Drake, Osher & Wallach, 1991). There is a clear need to reduce rates of substance use in this population and a better understanding of the reasons for substance use is required if treatments designed to help people reduce or abstain from substance use are to be successful.

Earlier studies which assessed the self reported reasons for use of people with psychosis (Addington & Duchak, 1997; Baker et al, 2002; Bergman & Harris, 1985; Dixon et al, 1991; Fowler et al, 1998; Gearon et al, 2001; Goswami et al, 2004; Green, Kavanagh & Young, 2004; Schofield, et al, 2006; Spencer, Castle & Michie, 2002; Test et al, 1989; Warner et al, 1994) reveal that for many, substance use seems to be motivated by the same kinds of factors that motivate substance use in the general population. People with psychosis use substances to increase pleasure, to fit in with others and to alleviate negative affective states such as boredom and depression. For example Dixon et al (1991) reported that the most commonly endorsed reasons for substance use were to get high (72%), to decrease depression (72%), to relax (64%) and to increase pleasure (62%). Around half also endorsed ‘to go along with the group’ indicating that social pressure was also present. Fowler et al (1998) reported that upwards of three quarters of substance users with schizophrenia

nominated drug intoxication effects as one of their reasons for use and around half nominated dysphoria relief. Gearon et al (2001) found that the most commonly endorsed reason to use drugs was peer pressure. Baker et al (2002) found that cannabis and amphetamine were used mainly for 'drug intoxication effects' (56.9% and 44% respectively) whilst alcohol was used mainly for 'dysphoria relief' (47.3%).

In one of the few studies to factor analyse reasons for use Spencer et al, (2002) reported five factors:

(1) 'Coping with unpleasant affect' (accounting for 37% of the explained variance);
(2) 'Enhancement' (10%);
(3) 'Social motives' (8%);
(4) 'Conformity and acceptance' (8%);
(5) 'Relief of positive symptoms and medication side effects' (6%).

Regression analyses revealed that 'coping with unpleasant affect' and 'enhancement' significantly predicted quantity of 'recent use' and problems related to use. 'Relief of positive symptoms and medication side effects' predicted dependence.

One hypothesis suggests that for some people experiencing psychosis substance use may be an attempt to self-medicate (Khantzian, 1985; 1997) and the literature shows that some individuals report using substances to try and counteract the side-effects of anti-psychotic medication; or as a preferred alternative to taking prescribed medications (Schneier & Siris 1987). However, there is substantial variation in the rates of substance use for self medication reported. Fowler et al (1998) found that illness-related reasons, including medication side effects, were nominated by just 0-9% of users across different drug classes. In contrast, Gearon et al (2001) reported that one third (36%) used substances to alleviate positive symptoms and almost half (48%) used them to cope with side effects.

Some of this apparent variability may be attributable to differences in sampling. Some of the studies mentioned included patients with other diagnoses (e.g. bipolar disorder and psychotic depression) and not all participants included met criteria for a current substance use disorder, and some may not have been using substances at the

time of questioning. Methodological differences may also have contributed to this variability. Some of the studies listed required participants to select their reasons for use from predetermined lists (e.g. Dixon et al, 1991, Spencer et al, 2002) whilst others used free response (e.g. Test et al, 1989). Some required participants to report all of their reasons for use, whilst others requested only the 'main' reasons, reporting only the first response given (Baker et al, 2002 and Fowler et al, 1998). Restricting respondents to reporting only their 'main' reasons for use may well have resulted in the underreporting of reasons relating to psychosis. The studies which used questionnaire methods tended to record higher levels of self medication but none employed methods with known validity and reliability for this client group. Gearon et al (2001) and Spencer et al (2002) were the only studies to use validated measures (the Inventory of Drug Taking Situations, Annis, Turner & Sklar, 1997) and an adapted version of the Drinking Motives Questionnaire, Cooper et al (1992) respectively) but neither measure has been validated on substance users with psychiatric diagnoses.

Here, we report on a study that attempted to address some of these sampling and methodological limitations. We used Q methodology (Stephenson, 1953) to examine reasons for substance use in a sample of people diagnosed with schizophrenia or schizoaffective disorder who met criteria for current alcohol or substance abuse or dependence. Q methodology was selected as it involves the ranking of statements (in this case reasons for use) requiring participants to consider all of the statements at once in relation to each other. Examination of the positioning of statements relating to self medication of psychiatric symptoms would, therefore, allow us to determine their relative significance. Q Sorts are analysed using a form of factor analysis in which each person's Sort is correlated with all of the other Sorts. The resultant factors consist of clusters of individuals who ranked statements in similar ways. This Sorting or Ranking, combined with the use of a forced normal distribution, means that there is less likelihood of the biased response patterns sometimes associated with more traditional methods for assessing subjective attitudes or behaviours. Another advantage and a key reason for its use in the current study is its suitability for use with people who may find it difficult to articulate a consistent rationale for their behaviours. Two previous studies have demonstrated its acceptability to people with serious mental illness: one investigating subjective experiences of neuroleptic

medication (Day, Bentall & Warner, 1996), and the other, auditory hallucinations (Jones, Guy & Ormrod, 2003).

3.2. Method

3.2.1. Development of the Q concourse

The Q sample for this study (the set of statements describing reasons for use) was derived from three main sources:

(1) the existing self report research literature;
(2) tape recordings of therapy sessions with people with schizophrenia and comorbid substance use problems (n = 30); and
(3) semi-structured interviews with people with schizophrenia or schizoaffective disorder who also had comorbid drug and alcohol problems (n = 10).

The existing research literature

A search of all of the self report studies (Addington & Duchak, 1997; Baker et al, 2002; Bergman & Harris, 1985; Dixon et al, 1991; Fowler et al, 1998; Gearon et al, 2001; Goswami et al, 2004; Green et al, 2004; Laudet et al, 2004; Noordsy, et al, 1991; Pristach & Smith, 1996; Spencer et al, 2002; Test et al, 1989; Warner et al, 1994) resulted in 53 discrete reasons for use being identified.

Tape recordings of therapy sessions

Audio tapes of the first three therapy sessions conducted with clients involved in a randomised controlled trial for people with psychosis and substance use disorder (The MIDAS trial: Motivational Interventions for Drugs & Alcohol misuse in Schizophrenia, http://www.midastrial.ac.uk) were listened to. In these early sessions the therapist seeks to understand the client's frame of reference in terms of life satisfactions and concerns and seeks to understand how the psychosis (onset, symptoms and illness consequences) is related to substance use. The therapist aims to identify how substance use fits into the concerns and life satisfactions and to get the client to elaborate about good things and the less good things about substance use. Tape recordings from the first thirty clients randomised into the trial were included. Out of a total of 90 sessions conducted 77 (85.6%) were audio taped. The extent to which clients discussed substance use in these sessions varied. Most mentioned substance use spontaneously but three clients did not discuss reasons for their

substance use at all, despite direct prompting by the therapist. In these recordings, 27 out of the 30 clients divulged at least one reason for use in these first three sessions (range = 0 - 16, median = 5). Interestingly, clients endorsed just 30 of the 53 reasons for use identified from the research literature but in addition, they divulged 20 reasons that were not identified in the research literature.

Interviews

A semi structured interview regarding substance use was administered to ten people with a diagnosis of schizophrenia (n = 9) or schizoaffective disorder (n = 1) who also had comorbid drug and alcohol problems. Participants were asked to identify the last time they used drugs or alcohol and to describe the situation they were in at the time (where they were, who they with and what they were doing) along with the thoughts and feelings they were experiencing at the time: their reasons for use. Participants were also asked about their reasons for use generally and were requested to identify their main reason for use. These interviews resulted in two additional reasons for use not previously identified: "to motivate me to do things" and "to increase voices".

The final concourse consisted of a list of 75 items describing reasons for alcohol and substance use (53 from the existing research literature, 20 from the taped therapy sessions and 2 from the interviews with people with schizophrenia). These were a mixture of high-risk situations (e.g. 'when I am depressed', 'when I feel under pressure from others'), positive outcome expectancies (e.g. 'to help me relax', 'to make me think better') and coping functions ('to drown out the voices'). The latter two types were carefully reworded to maintain consistency and to be comparable to the high risk situations (e.g. 'to help me to relax' became 'when I want to relax'). Once the concourse was finalised it was condensed on the grounds of duplication, similitude and intelligibility (see Stainton Rogers, 1995). This process of item reduction was carried out by four clinical psychologists and the first author and resulted in a final Q set of 58 items for inclusion in the final Q Sort.

3.2.2. Participants

Forty-five participants were recruited from community mental health teams, assertive outreach teams and inpatient psychiatric wards in three mental health trusts in Greater Manchester, UK. Participants were included if they met the diagnostic

criteria for schizophrenia, schizoaffective disorder or schizophreniform disorder combined with either substance abuse or dependence or alcohol use abuse or dependence (SCID IV criteria, First, Spitzer, Gibbon & Williams, 2002). The sample consisted of 34 (75.6%) males and 11 (24.4%) females with a mean age of 32.8 years (range 18 to 53 years). The majority (40, 88.9%) had a diagnosis of schizophrenia; the remainder, (5, 11.1%) schizoaffective disorder. For 42.2% the main substance used was cannabis. Alcohol was the main substance for 35.6%, amphetamine was the main substance for 17.8% and for 4.4% the main substance was either cocaine or heroin.

3.2.3. Procedure

The cards containing the 58 randomly numbered statements were shuffled and given to each participant to sort into the relevant categories. An A1-sized structured response grid (see Figure 1) containing 58 spaces (one for each of the statements) which forces a quasi-normal distribution of statements was provided. The condition of instruction was as follows:

"Use the statements to indicate the situations in which you use substance X (main substance used)/ drink alcohol. Please sort the statements from -5 (applies to me least) to +5 (applies to me most)"

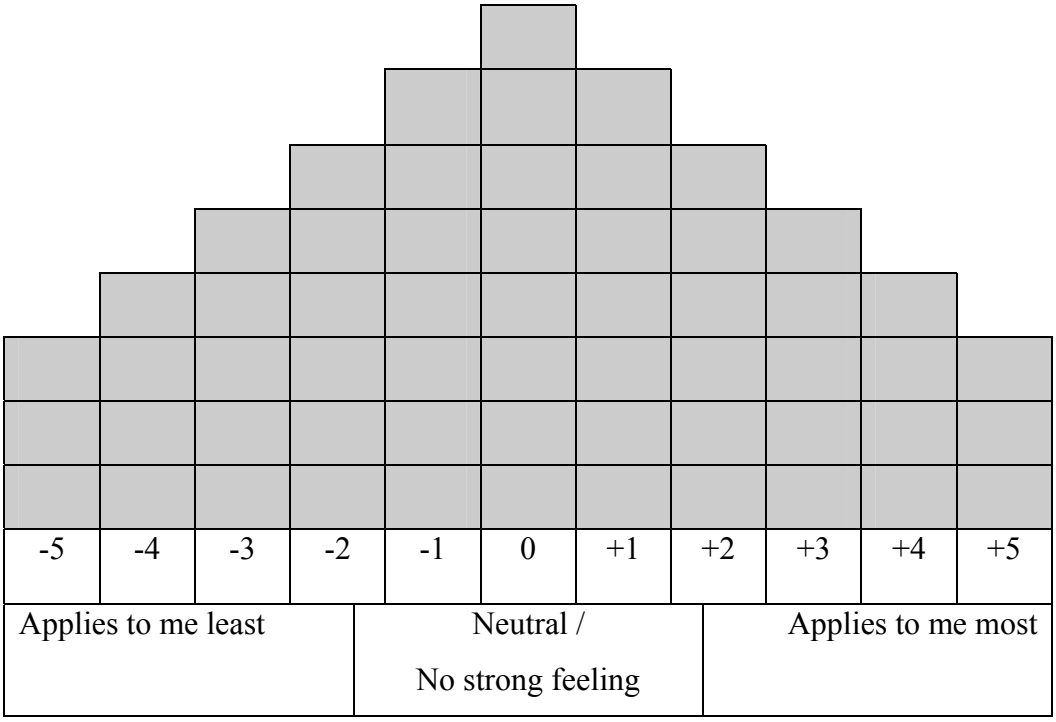
As a first step, to simplify the procedure and to help participants familiarise themselves with the statements, sorters were asked to sort the cards into three piles.

(1) contained all of the statements that applied to the sorter;
(2) contained all of the statements that did not apply; and
(3) contained 'neutral' statements, about which the sorters were either not sure or had no strong feelings about either way.

Next, sorters were asked to consider their 'applies to me' pile and were asked to choose the three statements that applied most strongly. These were placed in column 11 of the grid (labelled +5). They were then asked to consider their 'does not apply to me' pile and choose the three statements that applied least. These were placed accordingly (column 1, -5). The process was repeated (+4 and then -4, +3, -3 etc) finishing at the centre of the distribution when all cards were positioned. Participants were then given the opportunity to consider all items together and to rearrange any

items if they so desired. In addition, sorters were then asked to identify which of the three statements in the 'applies to me most' column (+5) applied to them the most. The final positioning of cards was recorded by the researcher administering the Q sort (the first author) on a copy of the grid.

Figure 1. Q sort response matrix



3.2.4. Data analysis

Data were analysed using a dedicated software package (PQ method: Schmolck, 2002) employing principle components analysis. The varimax procedure was used to rotate the factors as this maximises the amount of variance explained by the extracted factors. In contrast to conventional factor analysis the resulting correlation matrix shows relationships between individuals rather than relationships between items and allows for the identification of significantly loading Q sorts or *factor exemplars* which define each factor. PQ method merges these factor exemplars using the weighted average of all the sorts that load significantly on each factor to produce a *factor array*, an exemplary Q sort for each factor.

3.3. Results

Principle components analysis resulted in a three factor solution on which 40 of the sorts loaded and 45% of the variance was explained. Eighteen participants loaded

exclusively on factor 1 (accounting for 19% of the variance), 13 loaded on factor 2 (14%) and 9 loaded on factor 3 (12%). Four participants' sorts loaded on all three factors and one sort did not load on any of the factors. These five were excluded from the factor arrays (Table 1) and do not contribute to the interpretations detailed below.

3.3.1. Interpretation of the Q sorts

Factor 1 'chill out and have a good time with others'

This factor consisted of people (*n* = 18) who primarily used substances for enhancement purposes. They used drugs or alcohol to chill out, to have a laugh and to have a good time with others. They used when they wanted to 'feel good, have a laugh or be happier' (+5); when they wanted to 'chill out or relax' (+5) and when they were 'with friends and we want to have a good time' (+5). They also used drugs or drank alcohol when they had 'something to celebrate' (+4) and when they were feeling happy and content (+4). The social aspects of substance use were paramount for this group. There was evidence that social pressures were motivators of substance use: they used drugs or alcohol to when they wanted to fit in with others (+4) and when they felt under pressure from other people to use drugs or alcohol (+3). They used substances when they might feel awkward about refusing an offer of drink or drugs (+3) and to give them courage to face up to people socially (+2). As one of the exemplars for this study, a cannabis user, explained "*I suppose it's a crutch…I could sit there and talk to someone, have a conversation with them… it gets me talking, opens me up"*. Participants who loaded on this factor also endorsed the intoxicating effects of drugs and alcohol (+3) using when they wanted to 'get drunk, stoned or high'. They did not use drugs or alcohol for reasons directly related to their schizophrenia for example when they were hearing voices (-5), when they were feeling suspicious or paranoid (-5) or when they were experiencing medication side effects (-4) and only mildly endorsed using substances when they were feeling stressed (+2), depressed (+1) or anxious (+1). Another factor exemplar explained "*I don't take drugs when I am feeling negative or having bad thoughts 'cause I know that will make me feel worse… I take them when I'm feeling good and positive or I just want to wind down and chill out"*.

Factor 2 'cope with distressing emotions and symptoms'

In contrast to factor 1, factor 2 consisted of people (*n* = 13) who appeared to use drugs or alcohol for affect regulation purposes and to cope with or relieve the more distressing symptoms of schizophrenia. They used substances when they were depressed (+5); when they were anxious or tense (+5) and when they were feeling stressed (+5). They drank alcohol or used drugs when they were experiencing unpleasant thoughts (+4); when they wanted to escape their problems and worries (+4) *"you take drugs to get away from yourself and forget about things"* and when they were angry (+4). They also used drugs and alcohol when they were hearing voices (+4) *"it stops the voices, drowns them out completely"*; when they were feeling suspicious or paranoid (+3) and when they were thinking about bad things that had happened in the past (+3). They also used substances when they were feeling bored (+3) and lonely (+3). As one participant explained *"boredom, that's a big thing… and loneliness. If I had a girlfriend I wouldn't want to go out* [drinking]". These were the only participants to endorse using substances when they felt guilty about something (+2) or when they felt ashamed or bad about themselves (+1). They were less likely than those who loaded on the other two factors to report using substances to chill out and relax (+2) or to have a good time with friends (+2) and did not report themselves to be happy and content (-2) or confident and relaxed (-1) when they were drinking or using drugs. In contrast to those who exemplified the other two factors they were broadly neutral about the intoxicating and social aspects of use. One of the exemplars for this factor (who generally drank alone) explained *"I don't drink to get drunk. I don't even like drinking... "It knocks me out* [sends him to sleep], *I need it for peace of mind"*

Factor 3 'feel bigger, better and inspired'

This factor consisted of people (*n* = 9) who used substances for their augmenting effects. They used substances to help inspire them to be more creative (+5), *"It* [cannabis] *calms me down. I can write poetry and things"* and to alter their state of mind (+4) *"It opens your mind. I can have a joint and sit down and draw"*. Like those who loaded on the first factor they also used drugs and alcohol to enhance positive experiences, to feel good and have a laugh (+5) and to chill out and relax (+5). They used drugs and alcohol in order to feel more awake or alert (+4), more confident (+3) and more self aware (+3) *"it enhances me…You just get a new type of*

experience, it makes you feel that bit bigger and better, it makes you feel more confident about yourself". They reported using when they felt happy (+2) or excited (+2) and when they wanted to feel sexy, or increase their sexual enjoyment (+1). Participants who loaded on this factor also used drugs and alcohol for cognitive enhancement; to help them concentrate (+1) and to work and study better (+1). They also used substances when they were in need of motivation (+1). This group mildly endorsed statements relating to affect regulation but to a lesser extent than those who loaded on factor 2. They reported using substances when they felt anxious or tense (+2), depressed (+2), stressed (+1); when they were experiencing unpleasant thoughts (+1) and when they wanted to escape their problems and worries (+1). They did not highly endorse using substances to cope with or alleviate positive symptoms but were more likely to do so than those loading on factor 1 (see Table 1).

The correlations between factor scores indicate a degree of overlap between the three factors, particularly between factors 1 and 3 (0.59) which both emphasised using substances to enhance positive experiences. Both of these factors consisted of people who were using substances in an attempt to feel good or better about themselves but only the people who loaded on factor 1 were using substances for social enhancement purposes. In contrast, the enhancement purposes endorsed by people loading on factor 3 were broadly solitary in nature (to feel more creative, alert and self aware). Although all three factors endorsed items relating to affect regulation (feeling stressed, depressed and anxious) to some extent, only factor 2 highly endorsed reasons related to psychosis. Factor 2 did not correlate highly with either factor 1 (0.29) or factor 3 (0.26).

We used Chi-square and one way ANOVA to examine whether there were any differences between the people loading on each factor in terms of age, gender, diagnosis and type of substance used (alcohol vs. cannabis vs. amphetamine/ cocaine/heroin). There was one significant difference: factor 2 was exemplified by more females (53.8% of the people loading on this factor were female compared to 16.7% of those loading on factor 1 and 22.2% of factor 3; $X^2(2) = 6.8$, p = .033). The majority of participants whose sorts contributed to the third factor (77.8%) were drug rather than alcohol users but this was not a significant difference.

In addition to the forty Q sorts that contributed to the factor arrays there were an additional four confounded sorts. These were from male drug using participants whose sorts loaded on all three factors, having endorsed items from all three factors. In addition, one participant did not load on any of the three factors. This participant, a male alcohol user, endorsed both social reasons for use and reasons related to affect regulation. He also endorsed statements that few other participants endorsed. He drank when he felt that he had been discriminated against (+5), when he wanted to think more (+4), *"you think more substantially about things than you would usually"*, when he was 'in pain' (+3) and when he wanted to lose weight (+3) *"I don't get hungry when I'm drinking"*.

3.3.2. Main reasons for use

Each of the 58 items in the Q sample was endorsed (i.e. placed in the right hand side of the grid in columns +1, +2, +3, +4, or +5) by at least 3 of the 45 participants. The frequency counts and percentages for each statement are given in Table 2. As the table shows, more than a third of all participants reported using substances when they were feeling suspicious or paranoid (37.8%) or experiencing auditory hallucinations (35.6%). Very few participants (just 3 out of the 45, 6.7%) reported using substances when they were experiencing medication side effects.

The statements most often identified by participants as the single statement that "applies to me most" (selected from the 3 placed in column +5 once the sort was completed) were: 'when I want to chill out, relax or feel calm' (n = 5), 'when I am with friends and we want to have a good time' (n = 4), 'when I am feeling stressed' (n = 4), and 'when I am bored and want something to do to pass the time' (n = 3).

Table 1. Factor arrays

	Factor 1	Factor 2	Factor 3
1. When I want to feel drunk, stoned or high	+2	0	+3
2. When I want to feel good, have a laugh or be happier	+5	0	+5
3. When I have something to celebrate	+4	0	+1
4. When I want to stay awake or be more alert	0	-1	+4
5. When I am having trouble sleeping	+2	+3	+2
6. When I feel anxious or tense	+1	+5	+2
7. When I want to chill out or relax	+5	+2	+5
8. When I am feeling depressed	+1	+5	+2
9. When I am bored and want something to do to pass the time	+4	+3	+4
10. When I am feeling suspicious or paranoid	-5	+3	-1
11. When I hear sounds or voices that other people can't hear	-5	+4	-1
12. When I want to escape from my problems and worries	+1	+4	+1
13. When I am experiencing unpleasant thoughts	0	+4	+1
14. When I feel ashamed or bad about myself	-3	+1	-3
15. When I want to lose weight	-3	-5	-5
16. When I am experiencing medication side effects	-4	-3	-3
17. When I am in pain physically	-3	-2	0
18. When I want to feel normal	+1	-1	0
19. When I want to experience more voices	-5	-5	-5
20. When I want to think more thoughts	-4	-2	0
21. When I want to feel more emotions	-1	-4	0
22. When I want to feel more creative	0	-3	+5
23. When I want to work and study better	-3	-4	+1
24. When I want to feel sexy	-2	-4	+1
25. When I want to feel more confident	+2	-1	+3
26. When I want to feel more self aware	+1	-2	+3
27. When I want to fit in with other people	+4	0	-1
28. When I feel I need courage to face up to people	+2	-2	-2
29. When I am having trouble communicating with others	+1	+2	0
30. When my thoughts are racing	0	+1	+3
31. When I need motivation to do things	-1	-3	+1
32. When I am having trouble concentrating	-1	-1	+1

(continued)

Table 1. *(continued)*

	Factor 1	Factor 2	Factor 3
33. When I am feeling lonely	+1	+3	0
34. When I feel under pressure from others to use drugs / drink alcohol	+3	0	-3
35. When I am using drugs and want to enhance their effects or 'come down'	-1	+1	-1
36. When I want to increase my appetite	-4	-5	-3
37. When I want to 'feel different' or alter my state of mind	+2	0	+4
38. When I have been drinking and think about using drugs (or vice versa)	-1	+1	-2
39. When I think about how good it tastes	+2	-1	+2
40. When I feel I have been discriminated against	-1	0	-4
41. When I am thinking about bad things that have happened in the past	-1	+3	-1
42. When I am feeling happy and content with my life	+4	-2	+2
43. When I want to see whether I can take drugs / alcohol in moderation	0	-2	-2
44. When I feel tense or uneasy in the presence of someone	0	+2	0
45. When I feel awkward about refusing drugs / alcohol from someone	+3	1	-4
46. When I am with friends and we want to have a good time	+5	+2	+4
47. When I feel confident and relaxed	+3	-1	+3
48. When I unexpectedly find some drugs / alcohol	0	+2	0
49. When other people reject me or don't seem to like me	-2	+1	-2
50. When other people treat me unfairly or interfere with my plans	-2	+1	-2
51. When I feel excited about something	+3	0	+2
52. When I feel that my family is putting a lot of pressure on me	-2	-1	-5
53. When I am not getting along well with others at school or at work	0	-3	-3
54. When I start to feel guilty about something	-3	+2	-4
55. When I am angry at the way things have turned out	-2	+4	+1
56. When I feel controlled and want to feel more independent	-4	-3	-2
57. When there are arguments or fights at home	-2	-4	-4
58. When I am feeling stressed	+2	+5	+1

Table 2. Most frequently endorsed reasons for substance use

Q sort item	**Numbers endorsing each statement** (+1, +2 , +3, +4, +5)	
	N	**%**
When I want to chill out or relax	41	91.1
When I am with friends and we want to have a good time	38	84.4
When I am bored and want something to do to pass the time	36	80.0
When I have trouble sleeping	35	77.8
When I am feeling stressed	35	77.8
When I want to escape from my problems and worries	34	75.6
When I want to feel good, have a laugh or be happier	33	73.3
When I feel anxious or tense	33	73.3
When I feel confident and relaxed	32	71.1
When I have something to celebrate	31	68.9
When I am feeling depressed	31	68.9
When I am feeling happy and content with my life	28	62.2
When I feel excited about something	28	62.2
When I am experiencing unpleasant thoughts	27	60.0
When I am feeling lonely	27	60.0
When I want to 'feel different' or alter my state of mind	27	60.0
When I want to feel drunk, stoned or high	24	55.6
When I think about how good it tastes	24	53.3
When I am having trouble communicating with others	23	51.1
When I want to feel more confident	22	48.9
When I feel awkward about refusing drugs /alcohol from someone	21	46.7
When I am angry at the way things have turned out	21	46.7
When I feel tense or uneasy in the presence of someone	20	44.4
When I want to fit in with other people	20	44.4
When I unexpectedly find some alcohol /drugs	20	44.4
When I want to feel normal	18	40
When my thoughts are racing	18	40
When I have been drinking and think about using drugs (or vice versa)	18	40
When I want to stay awake, be more alert or energetic	17	37.8

(continued)

Table 2. *(continued)*

Q sort item	Numbers endorsing each statement (+1, +2 , +3, +4, +5)	
	N	**%**
When I am feeling suspicious or paranoid	17	37.8
When I want to feel more self aware	17	37.8
When I am using other drugs and want to enhance their effects or 'come down'	17	37.8
When other people treat me unfairly or interfere with my plans	17	37.8
When I am thinking about bad things that have happened to me in the past	17	37.8
When I am hearing sounds or voices that other people can't hear	16	35.6
When I feel under pressure from other people to use drugs / drink alcohol	16	35.6
When I am in pain	14	31.1
When I want to feel more creative	14	31.1
When I start to feel guilty about something	14	31.1
When I want to think more	13	28.9
When I want to feel sexy or increase my sexual enjoyment	13	28.9
When I feel I need courage to face up to people socially	13	28.9
When I need motivation to do things	13	28.9
When I want to feel more emotions	12	26.7
When I feel I have been discriminated against	12	26.7
When I want to see whether I can take drugs / alcohol in moderation	12	26.7
When other people reject me or don't seem to like me	12	26.7
When I want to work and study better	11	24.4
When I am having trouble thinking or concentrating	11	24.4
When I am feeling ashamed or bad about myself	10	22.2
When I am not getting along well with others	9	20
When I feel that someone is trying to control me	9	20
When I want to lose weight	8	17.8
When I feel that my family is putting a lot of pressure on me	8	17.8
When I want to increase my appetite	7	15.6
When there are arguments or fights at home	5	11.1
When I am experiencing medication side effects	3	6.7
When I want to experience more voices	3	6.7

3.4. Discussion

This study used Q methodology to explore the self reported reasons for substance use in a sample of people with schizophrenia or schizoaffective disorder and comorbid substance use. In terms of the most frequently endorsed reasons for use the results are broadly similar to the earlier studies (e.g. Addington & Duchak, 1997; Baker et al, 2002; Dixon et al 1991; Fowler et al, 1998; Schofield et al, 2006; Spencer et al, 2002; Warner et al, 1994), drugs and alcohol were used to relax, to feel good, to relieve boredom, anxiety and depression and to fit in with others. Around one in three participants reported using drugs or alcohol for reasons directly relating to their psychosis (i.e. suspiciousness, paranoia and auditory hallucinations), in line with the figures reported by Addington and Duchak (1997) and Gearon et al (2001) but significantly higher than those reported by Baker et al (2002), Dixon et al, (1991), Fowler et al (1998), Green et al (2004), Schofield et al (2006) and Spencer et al (2002). In line with the majority of the earlier studies very few participants in this study reported using substances when they were experiencing medication side effects. However, it is possible that so few endorsed this item because it did not make explicit the kinds of symptoms that might occur as a result of antipsychotic medication. Schofield et al (2006) reported difficulty sleeping and tiredness/lack of energy to be amongst the most commonly occurring side effects of anti-psychotic medication, items that were endorsed comparatively highly in this sample (by 77.8% and 37.8% of participants respectively).

The results of the factor analysis reveal a more complex picture than the frequency counts would appear to suggest. Three prototypical Q sorts were generated identifying three distinct groups of substance users:

(1) those who predominantly used for social and enhancement reasons, i.e. to *'chill out and have a good time with others'*;
(2) those who used to regulate negative affect and alleviate positive symptoms, to *'cope with distressing emotions and symptoms';* and
(3) those who used them to augment themselves and intensify their experiences, to *'feel bigger, better and inspired'*.

Previous self report studies have been unanimous in reporting that social reasons for substance use (including peer pressure) are key reasons for substance use by people with schizophrenia and the findings reported here confirm that for many, social reasons for use are indeed paramount. The structure of the second factor suggests that there is a sub-group of people with schizophrenia for whom substance use may be considered an attempt to self medicate. They used substances when they were experiencing both the positive symptoms of schizophrenia and the dysphoria and distress associated with it, providing some support for Khantzian's (1985;1997) self medication hypothesis. Interestingly, more women than men loaded on this factor and to our knowledge this is the only study of self reported reasons for use to find a gender difference in reasons for use in people with schizophrenia. According to research by The National Center on Addiction and Substance Abuse (CASA, 2006) women in the general population of substance users begin abusing alcohol and drugs for different reasons to men and may have more situations in their lives that trigger substance abuse. There is evidence to suggest that women without psychosis are more likely to use substances in response to stressful life events (Linsky, Strauss & Colby, 1985), negative emotional states and interpersonal conflict (Annis & Graham, 1995). Our findings indicate that this may also be true for women with a diagnosis of schizophrenia.

Previous self report studies agree that significant numbers of people with schizophrenia report using substances to increase energy, to stay awake, to aid concentration, to increase confidence and to feel more creative (e.g. Addington & Duchak, 1997; Dixon et al, 1991; Goswami et al, 2004; Warner et al, 1994) but this was the first to identify a sub group of users using predominantly for these purposes.

That there are different sub groups of substance users is a significant finding. It is evident that people with schizophrenia explain their substance use in different ways and it is possible that these different explanations may be related both to different patterns of substance use and to motivation to change, a hypothesis which, if confirmed, would have clear implications for therapeutic interventions targeting substance use in this population.

3.4.1. Clinical implications

We know that substance use comorbidity has many adverse consequences for people with schizophrenia. At the same time, clients' motivation for reduction of substance use is generally low (Baker et al, 2002; Barrowclough et al 2001). Many 'dually diagnosed' people do not consider their substance use to be a problem. People who use drugs and alcohol to enhance positive affect (factors 1 and 3) may be particularly likely to hold this view, especially those who use substances to facilitate social relationships (factor 1) and whose level of substance use may not be excessive in terms of their peer group. For these people interventions should take a non-confrontational approach and seek to explore and acknowledge the perceived benefits of substance use. Motivational interviewing, which seeks to help clients understand the impact of substance use by helping them to recognise the relationship of their substance use to their personal life goals may be a particularly useful intervention for these clients. For clients whose motivation to change is higher, or for those who are using substances to cope with distressing emotions or symptoms (factor 2), a cognitive behavioural intervention focused on relapse prevention may be more appropriate. Cognitive Behavioural Therapy (CBT) Relapse Prevention helps clients to identify the high risk situations (including moods and symptoms) which lead to substance use and to develop alternative coping skills for handling those situations.

This Q sample, or variants of it, could potentially be used as a therapeutic tool in either type of intervention in order to help clients describe and understand their drug and alcohol use. Moreover, the results could be used to inform the selection of cognitive and behavioural skills to be taught in CBT. For example clients endorsing the reasons that feature highly on factor 1 (social and enhancement) might require more assistance with lifestyle changes; those endorsing factor 2 (negative affect and positive symptoms) would require a greater focus on mental health problems whilst those endorsing factor 3 (positive affect) might suggest more work on challenging expectancies.

3.4.2. Limitations and suggestions for further research

The reasons for use reported here, whilst gathered from a variety of sources, may not be the only motivations for drugs and alcohol by people with schizophrenia. The

sample size was small and because we did not assess current psychiatric symptoms we were not able to link the three substance use profiles to psychiatric symptomatology. Similarly, we did not assess the amount of use or patterns of use beyond ensuring that participants met SCID IV criteria (First et al, 2002) for drug or alcohol abuse. Further research is necessary to explore the relationship of these different profiles to patient symptomatology and patterns of substance use as it is possible that different determinants of use may be related to distinct patterns of alcohol and drug consumption and symptom severity. Future research should also seek to explore the relationship of reasons for use to motivation to change and to examine reasons for use in the context of the known demographic risk factors such as age, gender, and socioeconomic status. This study provides some evidence that women may use substances for different reasons to men but the finding would need to be replicated in a larger scale, more representative study before firm conclusions could be drawn.

Chapter 4

Development and validation of a scale for assessing reasons for substance use in schizophrenia: the ReSUS scale

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Abstract

This paper reports on the development of a questionnaire to assess self reported reasons for substance use in schizophrenia: the 'reasons for substance use in schizophrenia' (ReSUS) scale and explores the relationship between reasons for use, psychiatric symptoms and substance use in a sample of 230 people with psychosis. Principal components analysis revealed three subscales: "coping with distressing emotions and symptoms', "social enhancement and intoxication" and "individual enhancement". Predicted associations were partially supported. 'Coping' reasons for use were related to positive symptoms, general symptoms, global functioning, depression and suicide behaviour as well as substance use (quantity of use and problems related to use). 'Individual enhancement' reasons were related to positive symptoms, to global functioning and to negative consequences of substance use. 'Social enhancement and intoxication' reasons were related to negative consequences of use but not to psychopathology. The findings suggest that the ReSUS is a reliable and valid instrument which can be used to explore self reported reasons for substance use and their relationship to psychotic symptoms in people with schizophrenia and other psychotic disorders.

4.1. Introduction

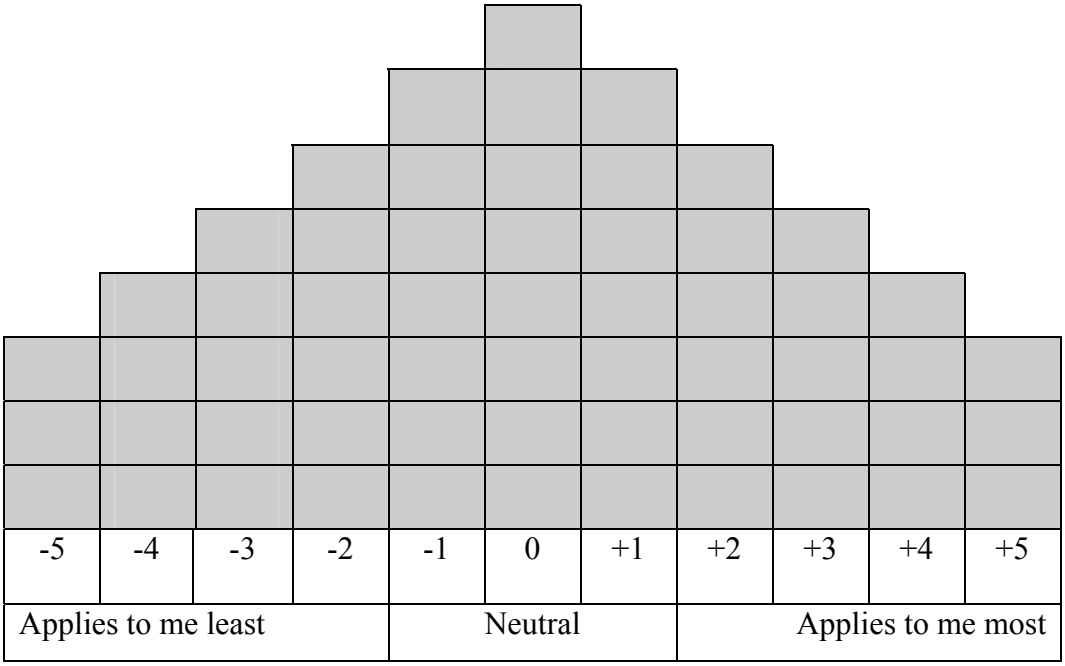
Around half of all people with a diagnosis of schizophrenia use drugs or alcohol (Regier et al, 1990). This comorbidity has been associated with a range of adverse clinical and social outcomes including more positive symptoms (Pencer & Addington, 2003), more relapses and hospitalizations (Linszen, Dingemans & Lenior, 1994), increased aggression and violence (Cuffel, Shumway, Chouligan & MacDonald, 1994) and higher rates of homelessness and housing instability (Drake, Osher & Wallach, 1991). Significantly, these adverse outcomes occur at lower levels of intake in people with schizophrenia than in the general community (Drake, Osher & Wallach, 1989). A better understanding of the reasons why people with schizophrenia use drugs and alcohol is essential if effective interventions aimed at reducing that use are to be developed.

People with a diagnosis of schizophrenia who also use drugs and alcohol report using substances for many different reasons. Research in this area has consistently shown that drugs and alcohol are used for many of the same reasons that people in the general population use them for: to increase pleasure, to fit in with others and to alleviate negative affective states such as boredom and depression (Addington & Duchak, 1997; Baker et al, 2002; Dixon, Haas, Weiden & Frances, 1991; Fowler, Carr, Carter & Lewin, 1998; Gearon, Bellack, Rachbeisel & Dixon, 2001; Goswami, Mattoo, Basu & Singh, 2004; Green, Kavanagh & Young, 2004; Schofield, et al, 2006; Spencer, Castle & Michie, 2002). There is less consensus about whether people use substances for reasons directly related to schizophrenia however (as suggested by Khantzian, 1985; 1997), either in terms of psychotic symptoms, the distress associated with those symptoms or the side effects of neuroleptic medication. Only a handful of studies have reported that people experiencing psychosis report using substances to self medicate (Addington & Duchak, 1997; Gearon et al, 2001; Goswami et al, 2004; Spencer et al, 2002) but because of sampling and methodological differences (in the way that dual diagnosis was defined; the diagnostic criteria used for substance use and the variety of measures to assess reasons for use) it is difficult to draw firm conclusions about these results.

In an attempt to address some of the methodological limitations of the earlier self report studies Gregg, Haddock and Barrowclough (2009) used Q methodology

(Stephenson, 1953) to examine reasons for use by people with a diagnosis of schizophrenia and current comorbid substance use. Q methodology requires participants to sort statements (in this case reasons for use) by placing them on a structured response grid (the Q grid, See Figure 1).

Figure 1: Q sort response grid



Q sorts are then analysed using a form of factor analysis in which each person's sort is correlated with all of the other sorts. The resultant factors consist of clusters of individuals who sorted statements in similar ways. Three sub groups of substance users were identified from the Q sorts: one group used drugs or alcohol primarily for enhancement purposes: to relax and to have a good time with others; to feel good and to celebrate. They endorsed the social aspects of substance use and used them to conform to their peer group, drinking alcohol or using drugs to fit in and when they felt under pressure from others. A second group used substances for 'self improvement' purposes and to intensify their experiences. They used drugs and alcohol in order to feel more creative, self aware, motivated and confident. The final group used drugs and alcohol to regulate negative affect and to alleviate or cope with the positive symptoms of schizophrenia: they used when they were feeling depressed, stressed, anxious, lonely and bored and when they were experiencing unpleasant thoughts; feeling suspicious or paranoid or were hearing voices. More than a third of the sample overall reported using substances when they were feeling

paranoid or were hearing voices, providing some support for Khantzian's (1985; 1997) self medication hypothesis.

It is possible that different determinants of substance use may be related to distinct patterns of alcohol and drug consumption, to symptom severity and to motivation to change. There is already some evidence to suggest that this is the case e.g. Spencer et al (2002) found that 'coping with unpleasant affect' motives significantly predicted quantity of recent use, problems related to that use and readiness to change in a sample of 69 patients with psychotic disorders. They also found that 'enhancement' motives predicted levels of recent use and 'relief of positive symptoms and medication side effects' motives predicted substance use dependence. Spencer et al (2002) also found that 'total motives' (the sum of the five motive subscales they reported) were predicted by both negative symptoms and by global symptom severity scores (assessed using the Brief Symptom Inventory). However they did not assess the impact of symptoms on individual motive subscales. Likewise Gregg et al (2009) did not assess current psychiatric symptoms and were therefore not able to examine the links between the three substance use profiles they identified and current psychiatric symptomatology. Additionally, few studies have examined reasons for use in the context of the known demographic risk factors such as age, gender and socioeconomic status. Gregg et al (2009) found that the women in their sample were more likely to be using substances for 'coping' reasons than men but this has not been reported elsewhere.

Further research is necessary to explore the extent to which different reasons for use are related to demographic variables, to patient symptomatology, different patterns of substance use and to motivation to change. If relationships between these variables are confirmed, this could potentially have significant treatment implications.

The aim of the current study was to explore these relationships in a large sample of people diagnosed with schizophrenia or another psychotic disorder who also met criteria for current alcohol or substance abuse or dependence. Because the Q sort procedure used by Gregg et al (2009) can take 30-60 minutes to administer its usefulness in a research context when administered as part of a battery of assessments is limited. We therefore developed a new questionnaire measure: the 'reasons for substance use in schizophrenia' (ReSUS) scale using some of the items

from Gregg et al's (2009) Q methodology study and present the psychometric properties of this new questionnaire here. We examined whether the subscales of the ReSUS were related to demographic variables, psychopathology, current levels of substance use, consequences of use and readiness to change. We hypothesised that:

a) The ReSUS scale would be a valid and reliable measure for assessing reasons for use in people with schizophrenia and other psychotic disorders
b) The ReSUS subscales would be similar to those identified by Gregg et al (2009)
c) Reasons for use would be related to gender, with females being more likely to use substances for 'coping' reasons for use than males
d) Reasons for use would be related to both quantity of substance use, with higher scores on the ReSUS subscales being associated with higher quantities of use, and problems associated with substance use, with higher ReSUS scores being associated with more self reported negative consequences.
e) Reasons for use would be related to psychiatric symptomatology with higher ReSUS scores being associated with more symptoms. Specifically, we predicted a positive correlation between 'coping' reasons for use (i.e. the use of substances to cope with or alleviate negative affective states and positive symptoms) and both positive and general symptoms (as measured by the Positive and Negative Syndrome Scales (PANSS; Kay, Fiszbein & Opler, 1987).

4.2. Method

4.2.1. Participants

A total of 230 participants took part in the study. The majority of participants (n = 195) were taking part in a randomised controlled trial involving patients with psychosis and substance use disorder (The MIDAS trial: Motivational Interventions for Drugs & Alcohol misuse in Schizophrenia. http://www.midastrial.ac.uk), 82 completed the questionnaire as part of their baseline assessment and an additional 113 completed it as part of their 12 month follow up. The remaining 35 participants had taken part in the Q methodology study conducted by Gregg et al (2009). Both studies recruited participants from community mental health teams and assertive outreach teams in four mental health trusts in Greater Manchester, UK. Participants were included if they met DSM IV diagnostic criteria for schizophrenia or another psychotic disorder combined with either substance abuse or dependence, or alcohol

abuse or dependence (SCID IV criteria, First, Spitzer, Gibbon and Williams, 2002) and met minimum criteria for current substance use (at least twice per week for at least half the weeks in the preceding twelve weeks). Ethical approval for the study was granted by the local research ethics committee and informed consent was obtained from all participants.

4.2.2. Procedure and measures

The original Q sample of 58 items was taken from a pool of 75 items derived from the existing self report literature; tape recordings of therapy sessions with 30 people involved in the MIDAS trial and from semi structured interviews with 10 people with a diagnosis of schizophrenia and comorbid substance use (see Gregg et al, 2009 for details). The Q sort items that were identified as 'applying least' to the study participants (those positioned in columns *-5, -4, -3, -2* of the Q sort grid, (See Figure 1) were identified and as a result 12 items were excluded. The final 46 items were assessed for similitude by 10 mental health professionals (6 research and 4 clinical psychologists) and a further 6 items were excluded (see appendix 2). The final questionnaire therefore consisted of 40 items describing situations in which people drink alcohol or use drugs. These were randomly ordered. Participants were asked to indicate whether they used their 'main' substance (the substance that they identified as being most problematic or the substance they used most often if they were not able to discriminate) in each situation "never", "sometimes", "often" or "almost always".

Psychopathology

The Positive and Negative Syndrome Scale (PANSS) was used to assess symptom severity. The PANSS is a 30 item structured clinical interview which is used to assess severity of positive symptoms, negative symptoms and general psychopathology in schizophrenia. Items are rated on 7-point Likert scales (0 absent – 7 severe) which can be summed to provide a total severity score. The psychotic symptom rating scales (PSYRATS, Haddock, McCarron, Tarrier & Faragher, 1999) were used to assess auditory hallucinations and delusions. The PSYRATS includes items on the intensity and amount of distress caused by these symptoms. High PSYRATS scores indicate more severe and less controllable symptoms. The Global Assessment of Functioning scale (GAF, American Psychological Association, 1994) was used to rate the social, occupational and psychological functioning of

participants. Depression was assessed using the Calgary depression scale (CDSS, Addington, Addington & Schissel, 1990) an interview which assesses depressive symptoms separate from positive, negative and extrapyramidal symptoms in people with schizophrenia. As part of this interview participants were also asked whether they had attempted suicide in the previous 12 months.

Substance use

The structured clinical interview (SCID-IV) substance use disorders module was used to differentiate substance abuse and dependence disorders. Data on current substance use behaviour (type and frequency of use over the preceding month) was collected using the timeline follow back interview (TLFB, Sobell and Sobell, 1992) and perceived consequences of substance use were assessed using the Inventory of Drug Use Consequences (InDUC, Blanchard, Morgerstern, Morgan, Labouvie & Bux, 2003). Motivational readiness to change was assessed using the Readiness to Change Questionnaire (RTCQ, Rollnick, Heather, Gold & Hall, 1992).

4.2.3. Data analysis

Data were analysed in two stages. First we conducted principal components analysis to examine the structure of the ReSUS scale and to develop subscales for use in subsequent analyses. Second we explored the relationship of the ReSUS subscales to demographic variables; psychiatric symptomatology, substance use, and readiness to change using multivariate analysis of variance (MANOVA) where data were categorical and Pearson correlations where data were continuous. Data on psychiatric symptomatology, readiness to change and extent of substance use (as determined by the TLFB and InDUC) were not available for the 35 participants who had taken part in the earlier Q study. Where data were missing, all available data were analysed and the sample size for each analysis is reported in the text or in the tables.

4.3. Results

4.3.1. Participant characteristics

The sample consisted of 205 (89.1%) males and 25 (10.9%) females with a mean age of 37.3 years (SD = 9.5). The majority (195, 84.8%) described themselves as white and most were unemployed (221, 96.1%). Two out of five (99, 43.1%) were living alone at the time of the assessments, one third (76, 33%) were living with a partner or other family members and the remainder (55, 23.9%) were living in shared

accommodation (including hostels) with non family members. The average age at which participants left full time education was 16 (SD = 1.7).

The majority of participants (197, 85.7%) had a diagnosis of schizophrenia. Other diagnoses included schizoaffective disorder (14, 6.1%), drug induced psychosis (7, 3.0%), psychosis not otherwise specified (7, 3.0%), delusional disorder (3, 1.3%) and schizophreniform disorder (2, 0.9%). Average illness duration was 11.9 years (SD 8.8).

On average, participants had been using their 'main' substance' for 13.1 years (SD = 8.9). Three quarters (175, 76.1%) met DSM IV criteria for substance use dependence whilst one quarter (55, 23.9%) met criteria for substance abuse. For half (120, 52.2%) the main substance was alcohol. Cannabis was the main substance for just under a third (68, 29.6%), followed by amphetamine (20, 8.7%), crack cocaine (10, 4.3%), heroin (6, 2.6%), cocaine (5, 2.2%) and ecstasy (1, 0.4%). On average, participants had used their main substance on 19 days of the previous 30 days (SD = 10.5). Over half (113, 58.2%) were poly substance users.

4.3.2. Most frequently endorsed reasons for use

On average, participants endorsed 24 reasons for use on the ReSUS (SD 8.4, range 4-38). The most frequently reported reasons for use (those items endorsed as being a reason for drinking/drug taking at least 'sometimes') were "When I want to chill out or relax" (217, 94.3%), "When I am feeling stressed" (208, 90.4%) and "When I am bored and want something to do to pass the time" (206, 89.6%). One half of all participants (50.9%) were using drugs or alcohol to cope with or reduce auditory hallucinations. Slightly more (57.4%) were using substances to abate feelings of suspiciousness or paranoia and two out of five (38.7%) were using substances when they were experiencing medication side effects. Frequency counts and percentages for each ReSUS item are given in Table 1.

Table 1. Most frequently endorsed reasons for use

ReSUS item	Frequency	%
When I want to chill out or relax	217	94.3
When I am feeling stressed	208	90.4
When I am bored and want something to do to pass the time	206	89.6
When I want to feel good, have a laugh or be happier	203	88.3
When I am with friends and we want to have a good time	194	84.3
When I want to escape from my problems and worries	194	84.3
When I feel anxious or tense	191	83.0
When I am feeling lonely	181	78.7
When I am feeling depressed	179	77.8
When I want to feel drunk, stoned or high	177	77.0
When I am feeling happy and content with my life	176	76.5
When I want to 'feel different' or alter my state of mind	165	71.7
When my thoughts are racing	163	70.9
When I have trouble sleeping	160	69.6
When I feel excited about something	160	69.6
When I am thinking about bad things that have happened to me in the past	158	68.7
When I want to feel more confident	157	68.3
When I am experiencing unpleasant thoughts	156	67.8
When I think about how good it tastes	151	65.7
When I am angry at the way things have turned out	146	63.5
When I want to feel normal	144	62.6
When I feel under pressure from other people to use drugs / drink alcohol	142	61.7
When I want to fit in with other people	135	58.7
When I am having trouble communicating with others	134	58.3
When I am feeling suspicious or paranoid	132	57.4
When I am having trouble thinking or concentrating	132	57.4
When I want to feel more self aware	126	54.8
When I start to feel guilty about something	124	53.9
When I want to feel more creative	122	53.0
When I am feeling ashamed or bad about myself	118	51.3
When I am hearing sounds or voices that other people can't hear	117	50.9
When I need motivation to do things	113	49.1

(continued)

Table 1. *(continued)*

ReSUS item	Frequency	%
When I want to stay awake, be more alert or energetic	111	48.3
When I unexpectedly find some drugs / alcohol	108	47.0
When I want to feel more emotions	106	46.1
When I feel I have been discriminated against	100	43.5
When I am in pain	100	43.5
When I have been drinking and think about using drugs (or vice versa)	97	42.2
When I am experiencing medication side effects	89	38.7
When I want to feel sexy or increase my sexual enjoyment	82	35.7

4.3.3. Principal components analysis

The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was .88 suggesting that the correlation patterns were compact and that a factor analysis should produce distinct and reliable factors (Field, 2005). Principal components analysis with oblique (direct oblimin) rotation initially resulted in ten components with eigenvalues greater than one. The Scree plot indicated that three of these components should be retained. The three component solution accounted for 41% of the variance. Two of the forty items did not load on any of the three components (≤0.30) however and the analysis was therefore repeated with these two items excluded. The final three component solution explained 42% of the variance. Eighteen items loaded on the first component, 11 loaded on the second and 9 loaded on the third. (See table 2 for component loadings). Component 1, labelled 'coping with distressing emotions and symptoms' consisted of all of the items relating to negative affective states and to psychiatric symptoms. Components 2 and 3 both contained items related to the improvement of positive affective states, but component 2, labelled 'social enhancement and intoxication', also contained items related to social acceptance e.g. 'when I am with friends and we want to have a good time', 'when I want to fit in' and 'when I am under pressure from others' and intoxication 'when I want to feel drunk, stoned or high'. Component 3, labelled 'individual enhancement', contained items that were more related to the improvement of internal emotional and physical states (e.g. 'when I want to feel more creative', 'when I want to feel sexy' and 'when

I am experiencing medication side effects'). The average score for each subscale was used as the subscale score in subsequent analyses.

Internal consistency of the three subscales was good. Cronbach's alpha for the 'coping' subscale was .91; .81 for 'social enhancement' and .82 for 'individual enhancement'. Alphas would not have been improved by the deletion of any items. Item-total correlations were also good ranging from .42 to .70 for 'coping', .40 to .60 for 'social enhancement' and .40 to .68 for 'individual enhancement'. Twenty five participants completed the measure on a second occasion four weeks after completing it for the first time in order to assess test-retest reliability. The pairs of scores for the three subscales were significantly correlated (r = .68, .87 and .76 respectively) and paired samples t tests showed that the total scores for each subscale did not significantly differ between the two time points (p = .53, .61, and .73 respectively).

We compared ReSUS subscale scores for those participants who had completed the assessments at baseline (*n* = 117) to those who had completed them at follow up (*n* = 113) and found no significant differences.

4.3.4. Relationship of ReSUS subscales to demographic variables

There were no significant relationships between the three ReSUS subscales and gender, age, racial origin or employment status (see Tables 3 and 4)**.** There was a main effect for 'living arrangements' but univariate tests showed that there were no significant differences between the three groups, other than a trend for participants who lived in house shares or in a hostel accommodation to be more likely to report using substances for 'individual enhancement' purposes (F(2,227) = 2.81, p = .062). The longer participants had stayed in full time education the less likely they were to report using substances for 'coping' (r = -217, p = .003) and 'individual enhancement' reasons (r = -.161, p = .026).

Table 2. Pattern matrix

Coping with distressing emotions and symptoms		
When I am experiencing unpleasant thoughts	.814	
When I feel ashamed or bad about myself	.782	
When I am thinking about bad things that have happened in the past	.715	
When my thoughts are racing	.703	
When I want to escape from my problems and worries	.679	
When I am feeling suspicious or paranoid	.677	
When I am feeling depressed	.675	
When I am angry at the way things have turned out	.671	
When I feel anxious or tense	.651	
When I start to feel guilty about something	.586	
When I am feeling stressed	.582	
When I am having trouble sleeping	.543	.342
When I feel I have been discriminated against	.528	
When I am hearing sounds or voices that other people can't hear	.516	
When I am having trouble thinking or concentrating	.498	
When I am having trouble communicating with others	.472	
When I am in pain physically	.452	
When I am feeling lonely	.431	
Social enhancement & intoxication		
When I am feeling happy and content with my life		.744
When I want to feel good, have a laugh or be happier		.669
When I am with friends and we want to have a good time		.659
When I want to chill out or relax		.563
When I think about how good it tastes		.545
When I feel excited about something		.505
When I want to fit in with other people		.454
When I want to feel drunk, stoned or high		.370
When I feel under pressure from others to use drugs / drink alcohol		.367
When I have been drinking and think about using drugs (or vice versa)		.343
When I am bored and want something to do to pass the time		.341

(continued)

Table 2. *(continued)*

Individual Enhancement			
When I want to feel more self aware			.758
When I need motivation to do things			.722
When I want to stay awake or be more alert			.716
When I want to feel more creative			.645
When I want to feel more emotions			.550
When I want to feel sexy			.475
When I am experiencing medication side effects			.442
When I want to feel normal			.439
When I want to feel more confident		.304	.425
% variance explained	**27.7**	**9.1**	**5.1**
Cronbach's alpha	**.91**	**.81**	**.82**
Mean score (SD)	**1.11 (.64)**	**1.32 (.58)**	**0.82 (.62)**

4.3.5. Relationship of ReSUS subscales to psychiatric history and symptomatology

DSM IV diagnosis was not associated with subscale scores and nor was illness duration. As predicted, scores on the 'coping' subscale of the ReSUS were significantly associated with the majority of psychopathology measures: there were positive correlations between 'coping with distressing emotions and symptoms' and PANSS total scores; PANSS general symptoms; PANSS positive symptoms; PYRATS hallucinations; PSYRATS delusions and Calgary depression (see Table 4 for Pearson correlation coefficients). Global assessment of functioning (GAF) scores were also negatively correlated with this subscale. Suicide behaviour (at least one attempt in the previous 12 months) was also associated with 'coping' reasons for use. Participants who had previously attempted suicide were more likely to be using substances as an attempt to cope with distressing emotions and symptoms ($F(1,185) = 7.9$, $p = .005$).

The 'individual enhancement' scale of the ReSUS was positively correlated with PANSS total scores, PANSS positive symptoms. PSYRATS hallucinations and negatively correlated with GAF symptom and total scores (Table 4). The 'social

enhancement' subscale was not related to any psychopathology variables.

4.3.6. Relationship of ReSUS subscales to type and level of substance use

Years of substance use was not related to the ReSUS subscales. Participants who met criteria for substance use dependence scored more highly on the 'coping' subscale than those who met criteria for abuse. There was also a significant main effect for drug type. Univariate tests showed that participants who were using amphetamines, crack cocaine and heroin were more likely to report using them for 'individual enhancement' reasons than those who were using other substances ($F(6,223) = 3.13$, $p = .006$).

There was a significant association between scores on the 'coping' subscale and the amount of money spent on the most problematically used substance over the previous 30 days (where the main substance was a drug) but not with the numbers of days abstinent from substance use suggesting that those who were using for coping reasons were not using their main substance more frequently but may well have been using it in greater amounts when they did. There were no relationships between the units of alcohol used by those whose main substance was alcohol and the ReSUS subscales.

Multivariate analysis revealed a significant main effect for motivation to change. Univariate tests showed that participants who were currently contemplating reducing their drug or alcohol use were more likely to be using substances for 'coping' reasons than those who were not considering making any such changes ($F(2,189) = 7.8$, $p = .001$).

The negative consequences of substance use (physical, intrapersonal, social, interpersonal and impulse control) were significantly correlated with all three subscale scores: higher ReSUS scores were related to more negative consequences. The 'social enhancement' and 'individual enhancement' subscales were not related to any other substance use variables.

Table 3. Mean differences in ReSUS subscale scores

		Subscale 1 Coping	**Subscale 2** Social enhancement	**Subscale 3** Individual enhancement	**Wilk's Lambda**
	N	**Mean (SD)**	**Mean (SD)**	**(Mean SD)**	**F (p)**
Gender					
Male	205	1.11 (.65)	1.33 (.59)	.84 (.63)	1.15
Female	25	1.08 (.55)	1.24 (.47)	.62 (.49)	(.330)
Racial origin					
White	195	1.13 (.65)	1.32 (.56)	.81 (.62)	1.14
Non-white	35	.98 (.50)	1.37 (.67)	.85 (.63)	(.333)
Living Arrangements					
Alone	99	1.05 (.59)	1.30 (.54)	.74 (.51)	2.48
With partner/family	76	1.21 (.69)	1.38 (.62)	.80 (.71)	(.022)
Shared/hostel	55	1.07 (.64)	1.31 (.61)	.98 (.64)	
Employment Status					
Unemployed	221	1.11 (.64)	1.33 (.59)	.82 (.62)	.03
Employed	9	1.12 (.45)	1.30 (.44)	.85 (.59)	(.993)
DSM IV Diagnosis					
Schizophrenia	197	1.10 (.63)	1.36 (.58)	.84 (.62)	.96
Schizoaffective Disorder	14	1.22 (.64)	1.11 (.58)	.68 (.63)	(.809)
Schizophreniform Disorder	2	.81 (.51)	1.23 (.71)	.44 (.47)	
Delusional Disorder	3	1.01 (.39)	1.12 (.67)	.63 (.63)	
Drug induced psychosis	7	1.12 (.75)	1.14 (.67)	.82 (.81)	
Psychosis NOS	7	1.10 (79)	1.06 (.35)	.54 (.63)	
Suicide behavior					
At least one attempt	31	1.42 (.50)	1.22 (.43)	.86 (.53)	4.60
No suicide behaviour	157	1.06 (.68)	1.31 (.62)	.82 (.67)	(.004)

(continued)

Table 3. *(continued).*

		Subscale 1 Coping	**Subscale 2** Social enhancement	**Subscale 3** Individual enhancement	**Wilk's Lambda**
	N	**Mean (SD)**	**Mean (SD)**	**(Mean SD)**	**F (p)**
DSM substance use					
Abuse	37	.84 (.59)	1.21 (.62)	.75 (.64)	3.04
Dependence	158	1.18 (.66)	1.32 (.58)	.84 (.63)	(.030)
Main substance					
Alcohol	120	1.09 (.65)	1.26 (.59)	.72 (.56)	1.84
Cannabis	68	1.05 (.58)	1.42 (.61)	.78 (.61)	(.018)
Amphetamines	20	1.22 (.59)	1.33 (.49)	1.20 (.73)	
Crack cocaine	10	1.36 (.82)	1.55 (.82)	1.27 (.84)	
Cocaine	5	.89 (.87)	1.02 (.28)	.87 (.58)	
Heroin	6	1.38 (.51)	1.32 (.32)	1.11 (.44)	
Ecstasy	1	1.22	1.00	1.11	
Readiness to Change					
Precontemplation	51	.85 (.66)	1.21 (.66)	.76 (.67)	3.80
Contemplation	77	1.30 (.64)	1.36 (.54)	.80 (.62)	(.001)
Action	64	1.12 (.61)	1.33 (.59)	.91 (.63)	

Table 4. Associations between ReSUS subscale scores and continuous demographic, psychopathology and substance use variables

	N	**Subscale 1** Coping	**Subscale 2** Social enhancement	**Subscale 3** Individual enhancement
Age	230	.004	-.071	.030
Years in full time education	191	-.217**	-.123	-.161*
Illness duration	193	.079	-.021	.115
PANSS total	193	.269**	-.009	.152*
PANSS positive	193	.209**	.040	.187**
PANSS negative	193	.114	-.024	.126
PANSS general	193	.279**	-.030	.074
Psyrats Delusions	195	.264**	.057	.105
Psyrats Hallucinations	188	.259**	.057	.157*
GAF symptoms	190	-.289**	-.067	-.162*
GAF disability	190	-.185*	.002	-.090
GAF total	190	-.272**	-.069	-.191**
Calgary depression	192	.339**	-.050	.055
Years of substance use	187	.045	.009	.121

(continued)

Table 4. *(continued)*

	N	Subscale 1 'Coping'	Subscale 2 'Social enhancement'	Subscale 3 'Individual enhancement'
Days abstinent from main substance	192	-.005	.054	.097
Cost of main substance	86	.215*	.117	.150
Units of alcohol	106	.150	.104	.131
InDUC consequences				
Physical	193	.496**	.256**	.232**
Intrapersonal	192	.493**	.193**	.200**
Social responsibility	193	.406**	.291**	.257**
Interpersonal	192	.387**	.179*	.261**
Impulse control	192	.452**	.251**	286**

**Pearson correlation coefficient significant at p<0.05; ** significant at p<0.01*

4.4. Discussion

The ReSUS is a valid and reliable measure for assessing reasons for substance use in people with schizophrenia and other psychotic disorders. Each of the items in the ReSUS questionnaire was endorsed by at least a third of participants confirming the relevance of the scale's items for people with psychosis and the three subscales demonstrated good levels of internal consistency and stability over time. Analyses examining associations between the ReSUS subscales, psychopathology and substance use also provided support for the validity of the measure. As predicted, the three subscales were broadly in line with the three factors identified by Gregg, Haddock & Barrowclough (2009): the first subscale contained items related to distressing emotions and symptoms (including feelings of shame, boredom and depression), the second consisted of items related to social acceptance and enhancement (to fit in, feel good and get high) and the third contained items that were related to the improvement of internal emotional and physical states (to feel sexy, creative and confident). The most frequently endorsed reasons for use: "when I

want to chill out or relax", "when I am feeling stressed", "when I am bored and want something to do to pass the time" and "when I want to feel good, have a laugh or be happier" were broadly similar to those reported by the earlier self report studies (e.g. Addington & Duchak, 1997; Baker et al, 2002; Dixon et al 1991; Fowler et al, 1998; Gregg et al, 2009; Schofield et al, 2006; Spencer et al, 2002). Significantly, more than half of all participants were using drugs or alcohol to cope with or reduce auditory hallucinations, or abate feelings of suspiciousness or paranoia at least some of the time and two out of five reported using substances when they were experiencing medication side effects, figures higher than those reported by Gregg et al (2009) and elsewhere in the literature (see Gregg, Barrowclough & Haddock, 2007 for a review). These high rates of 'self medication' may be partly attributable to the homogenous nature of our sample. In contrast to some of the earlier studies all of our study participants met DSM IV criteria for a psychotic disorder and all had a current substance abuse or dependence disorder.

In contrast to our predictions and the findings of Gregg et al (2009), ReSUS subscale scores did not vary according to gender. Although the men in our sample had slightly higher mean scores on each of the three subscales this difference was not statistically significant. However, we must also note that there were just 25 women in the sample, and it could well be the case that a sample with a higher proportion of women may have found a difference. Similarly there were very few employed people in the study and just 15% were 'non-white' making comparisons involving these underrepresented groups difficult. Just one demographic variable was associated with reasons for use: participants who had spent longer in full time education were less likely to report using substance for either 'coping' or 'individual enhancement' purposes.

We anticipated that reasons for use would be related to both quantity of substance use, with higher scores on the ReSUS subscales being associated with higher quantities of use and with problems associated with substance use, with higher ReSUS scores being associated with more self reported negative consequences. The results only partially supported our hypotheses: there was no association between ReSUS subscales and frequency of substance use i.e. the number of days abstinent from substance use according to the timeline followback. Nor was there a significant

relationship between ReSUS subscales and the units of alcohol consumed by those whose *main* substance was alcohol. There was however a significant correlation between the 'coping' subscale of the ReSUS and the cost of the main substance where the main substance used was a drug indicating that participants who used drugs for this reason were using in higher quantities. People who used substances for coping reasons also reported greater negative consequences as a result of that use. These findings provide support for Spencer et al (2002) who found that 'coping with unpleasant affect' significantly predicted quantity of recent use and problems related to that use. We also found evidence to support Spencer et al's assertion that people with psychosis who use substances to cope with unpleasant affect and positive symptoms are more likely to be psychologically dependent on those substances. Participants in our sample who met criteria for drug or alcohol dependence scored more highly on the coping subscale than those who met abuse criteria.

'Individual enhancement' reasons for use were related to the type of substance consumed (amphetamine, crack cocaine and heroin users were more likely to report using for these reasons) and to greater negative consequences but were not related to either the frequency or quantity of drugs or alcohol consumed. Likewise 'social enhancement' reasons for use were related to negative consequences of substance use but not to type, frequency or quantity of substance use.

We expected that reasons for use would be related to psychiatric symptomatology with higher ReSUS scores being associated with more symptoms and predicted a positive correlation between 'coping' reasons for use and both positive and general symptoms. Our hypotheses were partially supported. 'Coping with distressing emotions and symptoms' was positively correlated with PANSS total, positive and general symptom scores. Additionally, coping reasons for use were related to PSYRATS hallucinations and delusions; GAF symptoms and disability; depression and suicide behaviour indicating that participants who were experiencing the most symptoms and experiencing the highest levels of distress were more likely to be using substances in an attempt to alleviate or cope with those symptoms.

The individual enhancement subscale was associated with greater positive symptoms (reflected in higher PANSS total and positive symptom scores and PSYRATS hallucinations scores) and with decreased functioning but the social enhancement

subscale was not related to any psychopathology measures.

It is interesting to note that participants using substances for 'coping' reasons were more likely to be contemplating reducing their drug or alcohol use. As coping reasons for use were also related to both greater psychiatric symptomatology and greater negative consequences resulting from substance use it is possible that this relationship stems from an understanding that substance use is no longer having the desired effect. As Addington & Duchak (1997) and Dixon (1991) found, some people may report using drugs and alcohol to make them feel better yet report feeling worse afterwards.

That the coping subscale showed the greatest number of associations with psychopathology and substance use variables is significant. Research has shown that people with schizophrenia may possess a relatively limited repertoire of coping strategies (Rollins et al, 1999) and that they employ a range of cognitive and behavioural strategies in an attempt to control or cope with their symptoms (e.g. Falloon & Talbot, 1981; Lobban, Barrowclough & Jones, 2004) thus it may be the case that substances are being used by people with psychosis as a general coping mechanism to cope with the symptoms of schizophrenia and with the negative affective experiences associated with a diagnosis of schizophrenia. Our results would certainly seem to indicate that this is the case. If the direction of these hypothesised relationships were confirmed in future research it would provide supportive evidence for the utility of cognitive behavioural treatment approaches in reducing substance use in people with psychosis.

4.4.1. Limitations and suggestions for further research

The study has several limitations. The sample was overwhelmingly male, white and unemployed making our comparisons of gender, racial origin and employment status difficult to draw conclusions from. We did not record the socioeconomic status of participants and could not make comparisons on this basis. Future research should seek to ensure that all demographic sub groups are adequately represented so that comparisons between groups can be made. The majority of participants were alcohol and cannabis users and comparatively few were using different classes of substances. Future research should also seek to ensure that adequate numbers of users of each type of substance are represented so that comparisons between substance types can

be made. Significantly, although more than half of the sample was using more than one substance we only examined reasons for use for the main substance, we were therefore unable to fully assess whether different substances were used for different reasons. Our between subjects analysis appeared to suggest that alcohol and cannabis were used for similar reasons but that other classes of drugs (stimulants and opiates) were more likely to be used for individual enhancement purposes. It would have been interesting to examine whether individual participants were selecting specific substances for specific reasons as Khantzian (1985) proposed.

Despite these limitations we were able to demonstrate the reliability and validity of the ReSUS scale, a scale which could be usefully employed as both a research instrument and a therapeutic tool in order to help clients describe their drug and alcohol use. Future research with the ReSUS should explore the observed relationships further, in particular the association between 'coping' reasons for use, symptoms and substance use variables and seek to disentangle the direction of these relationships, ideally in longitudinal studies. A fuller understanding of these relationships could inform the development and selection of treatments aimed at reducing substance use by people with psychosis.

Chapter 5

Reasons for substance use and their relationship to coping and psychopathology in a non-clinical population

Abstract

This paper examines self reported reasons for substance use in a cross-sectional sample of university students and investigates the relationship of reasons for use to sub clinical psychopathology, coping strategies and to drug and alcohol consumption. A model of substance use which hypothesises that reasons for use and coping strategies mediate the link between psychopathology and substance use is proposed and is tested and refined using structural equation modelling. Results confirm that psychopathology is related to substance use and that the relationship is partially mediated by reasons for substance use and coping, specifically dysfunctional coping.

5.1. Introduction

It is well known that substance use is common among people with psychotic disorders: around half of all people with a diagnosis of schizophrenia also use drugs or alcohol (Regier et al, 1990). However, despite a substantial literature on the relationship between substance use and psychosis the aetiology of these increased rates of substance use is not yet understood. It is not clear whether psychosis predisposes people to use drugs and alcohol; whether substance use leads to psychosis, and whether other risk factors play a part (see Gregg, Barrowclough & Haddock, 2007 for a review).

A number of authors have sought to understand the relationship between substance use and psychopathology by investigating self reported reasons for substance use. The existing literature suggests that for many people with psychosis, reasons for use are similar to those found in the general population of substance users. Substances are primarily used to increase pleasure, to fit in with others and to alleviate negative affective and emotional states such as boredom and depression (e.g. Addington & Duchak, 1997; Dixon, Haas, Weiden & Frances, 1991; Fowler, Carr, Carter & Lewin, 1998; Gregg, Haddock & Barrowclough, 2009; Pencer & Addington, 2008; Schofield, et al, 2006; Spencer, Castle & Michie, 2002). A handful of studies have also reported that some people with psychosis use substances to self medicate symptoms and associated unpleasant states (e.g. Gearon, Bellack, Rachbeisel, & Dixon, 2001; Goswami, Mattoo, Basu & Singh, 2004; Gregg, Haddock & Barrowclough, 2009).

In one of the few studies to investigate the impact of these reasons for use on actual substance use Spencer et al (2002) found that 'coping with unpleasant affect' and 'enhancement' reasons both predicted levels of recent substance use in a sample of people with psychotic disorders. Furthermore, the use of substances for the 'relief of positive symptoms and medication side effects' was found to predict substance use dependence. More recently, Gregg, Barrowclough & Haddock (2009) found that more 'coping' reasons for use (that is, those related to negative affective states and psychotic symptoms) were related to greater substance use and problems related to that use whilst 'individual enhancement' reasons (including expansion motives such as feeling more self aware or more creative) and 'social enhancement and

intoxication' reasons for use (to get high, to have a good time with others) were related to increased negative consequences of use.

The relationship of reasons for use to substance use has historically been better studied in non-clinical samples, typically involving college and university students (e.g. Boys & Marsden, 2003; Brodbeck, Matter, Page & Moggi, 2007; Cooper, 1994; Cooper, Frone, Russell, & Mudar, 1995; Cox, Hosier, Crossley, Kendall & Roberts, 2006; Simons, Correia, Carey & Bosari, 1998; Williams & Clark, 1998). This research has tended to focus on alcohol use and generally divides reasons for use into two broad categories: negative reinforcement ('escape' drinking/drug taking or using substances to cope) and positive reinforcement (usually 'social' drinking/drug taking) with the majority of studies showing that young people primarily drink alcohol and use drugs for positive reinforcement purposes. Drinking for positive/social reasons has been linked to more moderate drinking patterns (e.g. Cooper, 1994) whilst 'drinking to cope' has been related to both heavy drinking and increased negative consequences from drinking (e.g. Abbey, Smith & Scott, 1993; Britton, 2004; Cooper, 1994; Cooper et al, 1995). Cox et al (2006) found that negative reasons for use were stronger predictors of drinking problems than positive reasons and Williams & Clark (1998) found that 'escape drinking' predicted binge drinking and 'social drinking' predicted levels of alcohol consumption. Research with cannabis users has also shown that coping related reasons for use are associated with greater levels of use (Johnston & O'Malley, 1986; Lee, Neighbors & Woods (2007).

A growing body of literature has found relationships between substance use and psychopathology in non-clinical samples. Drug and alcohol use has been related to general psychiatric symptoms in college students (e.g. Geisner, Larimer & Neighbors, 2004; Miller, Miller, Verhegge, Linville & Pumariega, 2002) and to schizotypy (e.g. Bailey & Swallow, 2004; Dumas et al, 2002; Esterberg, Goulding, McClure-Tone & Compton, 2009; Larrison, Briand & Sereno, 1999; Mass, Bardong, Kindl & Dahme, 2001; Nunn, Rizz & Peters, 2001; Schiffman, Nakamura, Earleywine & LaBrie, 2005; Skosnik et al, 2001). The majority of studies investigating the link between substance use and schizotypy have focussed on cannabis use. Mass et al (2001) found that cannabis users exceeded matched controls

in two aspects of schizotypy: eccentric behaviour and perceptual aberration. Dumas et al (2002) found that regular and past or occasional cannabis users had higher schizotypal personality scores than those who had never used cannabis. Schiffman et al (2005) found increased schizotypy among recent cannabis users and also reported that schizotypal symptoms generally preceded cannabis use. In contrast Barkus, Stirling, Hopkins & Lewis (2006) found that cannabis use per se was not related to schizotypy but they did find that high scoring schizotypes were more likely to report psychosis-like experiences and unpleasant effects associated with cannabis use. Very few studies have examined schizotypy in relation to alcohol and findings so far have been inconsistent. Nunn et al (2001) found that alcohol use was related to lower introvertive anhedonia (negative schizotypy) and was not related to positive schizotypy. Larrison et al (1999) found that higher alcohol use was related to lower positive schizotypy scores (they did not assess negative schizotypy) and Esterberg et al (2009) found an association between greater disorganised schizotypy and alcohol use but found no evidence of a relationship to either positive or negative schizotypy. Thus there is fairly consistent evidence of a link between positive schizotypy and cannabis use but no conclusions can yet be drawn about alcohol use or the use of other substances and schizotypy.

Only a handful of studies have attempted to understand relationships between schizotypy / subclinical psychopathology and substance use in the context of reasons for use. Brodbeck et al (2007) found that cannabis users showed more distress and greater psychopathology compared to non-users and that significantly, those who used for coping reasons displayed poorer mental health, greater psychopathology and more psychosocial distress than those who used for social reasons. Those who used cannabis to cope also consumed more cannabis than those who used it for social reasons. In contrast, Chabrol, Duconge, Casas, Roura & Carey (2005) found that coping motives did not predict cannabis use. In this study enhancement motives predicted cannabis use in males and expansion motives (using to feel more aware; more creative) predicted cannabis use in females. Psychopathology did not predict cannabis use and they concluded that motives were more important than psychopathology in predicting cannabis use.

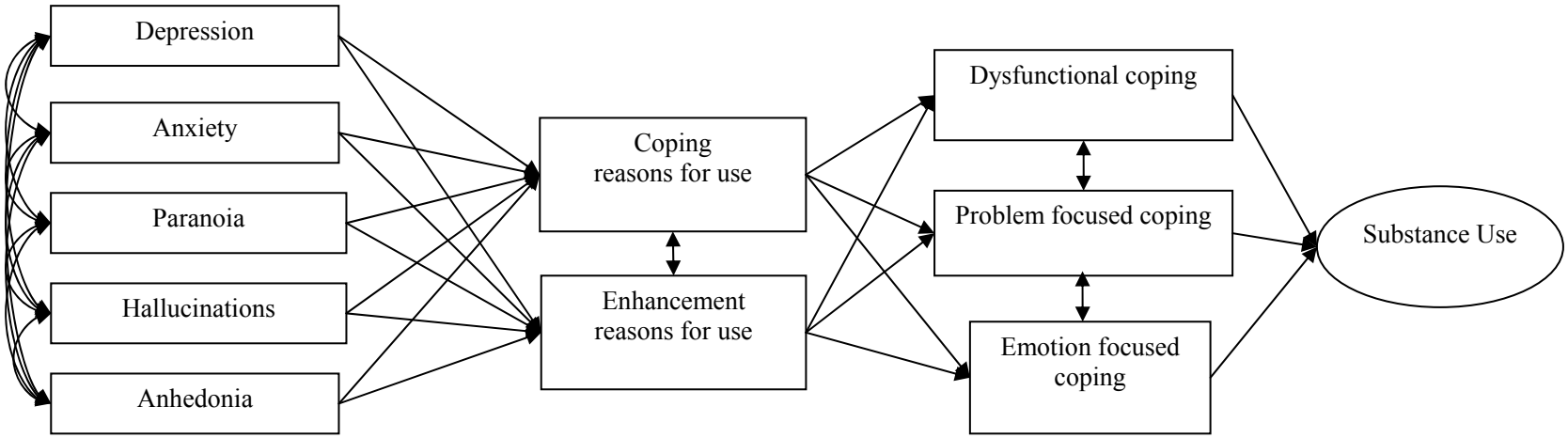
More recently Ham, Zamboanga, Bacon & Garcia (2008) investigated the relationship of social anxiety to hazardous drinking and found that coping motives partially mediated the relationship. Likewise Goldsmith, Tran, Smith & Howe (2009) investigated the relationship of alcohol expectancies and motives to generalised anxiety and found that alcohol expectancies and drinking to cope motives mediated the relationship between generalised anxiety and heavy drinking in negative-affect situations.

It is thought that 'escape' drinking and drug taking /using substances to cope occurs when other, more adaptive, coping strategies are either unused or unavailable (Wills & Hirky, 1996) and there is some evidence to suggest that this is the case (e.g. Cooper, Russell & George, 1988; Unger, Sussman & Dent, 2003; Wills, Walker Medoza & Ainette, 2006). Cooper et al (1988) found that drinking to cope was most likely among people who relied on avoidant styles of coping with emotion and held positive expectancies for the effects of alcohol. Wills et al (2006) found that poor behavioural and emotional control were associated with greater substance use and that furthermore, poor emotional control was associated with coping reasons for substance use.

Thus despite a large literature highlighting the importance of coping reasons for use in understanding the development and maintenance of drug and alcohol use problems in both clinical and non clinical samples, no studies to date have examined how these reasons for use interact with symptomatology and coping strategies/styles to influence substance use outcome in either type of sample. The present study therefore aimed to investigate the relationships between psychopathology, reasons for substance use, coping strategies and problematic drug and alcohol consumption in a non-clinical population. We examined self reported reasons for substance use and investigated the relationship of these reasons for use to psychopathology, coping and substance use. We hypothesised that sub-clinical psychopathology would be related to reasons for use, specifically coping reasons for use. We predicted that coping reasons for use would be related to coping strategies: increased use of dysfunctional copings strategies and / or decreased use of more adaptive coping strategies and further hypothesised that both reasons for use and coping strategies would mediate the link between psychopathology and substance use. We propose a

meditational model to explain these relationships [see Figure 1] based on Marlatt and Gordon's social-cognitive model of addiction (Marlatt & Gordon 1985) which proposes that certain situations and cues trigger drug or alcohol related thoughts which in the absence of alternative coping strategies and in the context of low self efficacy for resisting use make the person vulnerable and more likely to use substances. We use structural equation modelling to test and refine the model further.

Figure 1. Hypothesised Model



5.2. Method

5.2.1. Participants

Participants were undergraduate and postgraduate students at the University of Manchester, UK, who responded to an email invitation to take part in an online study investigating 'reasons for alcohol and drug use; personality and coping'. Of the 248 students who responded, 27 (10.9%) either did not fully complete the main questionnaires or were not engaged in problematic drug or alcohol use and were therefore excluded from the analyses. The remaining 221 were mostly undergraduate students (79.3%) largely White British (93.9%) and female (72.2%). The mean age of the sample was 22.9 years (SD = 5.2).

5.2.2. Measures

Substance use

Participants were asked to list which substances they had used in the previous three months and to state how often they were using each one, also identifying their 'main' substance (the substance that they had used most frequently in the preceding three months, or, if two or more substances were used with equal frequency, the substance that they identified as being the one they would find 'hardest to go without'). The alcohol use disorders identification test (AUDIT, Saunders, Aasland, Babor, de la Fuente and Grant, 1993) and the 20 item drug abuse screening test (DAST, Skinner, 1982) were used to determine the extent to which respondents were using drugs and or alcohol problematically. The AUDIT contains 10 questions about level of alcohol consumption, drinking behaviour and associated problems and is used to identify people whose alcohol consumption has become hazardous to their health. A cut off score of 6 or above indicates problematic drinking in student samples (Adewuya, 2005; Kokotailo et al, 2004) and respondents scoring below this level were not included. As a result, three respondents were excluded from the analyses. The 20 item DAST taps various drug use consequences that are combined in a total DAST score to yield a quantitative index of problems relating to drug use and can be used to identify people with a probable drug use disorder. A score of 5 or more was used as the cut off score (Cocco and Carey, 1998). No participants were excluded on the basis of their DAST scores. Both the AUDIT and the DAST total scores were also used as a continuous outcome measure.

Reasons for substance use

The reasons for substance use in schizophrenia questionnaire (ReSUS, Gregg, Barrowclough & Haddock, 2009) was used to assess the situations in which participants were using their 'main' substance. The questionnaire consists of 40 items describing situations in which people drink alcohol/use drugs. Participants were asked to indicate whether they used their main substance in that situation "never", "sometimes", "often" or "almost always". Data from a clinical sample (Gregg et al, 2009) revealed three subscales 'coping with distressing emotions and symptoms', 'social enhancement and intoxication' and 'individual enhancement' each of which was found to have good internal reliability. (Alphas in the clinical sample were .91, .81 and .82 respectively)

Coping

Coping strategies were assessed using the brief COPE (Carver, 1997). The brief COPE is a shortened version of the original 60 item self report inventory developed by Carver, Scheier & Weintraub (1989). The brief cope yields fourteen distinct coping strategies. Respondents are asked to indicate the degree to which they typically utilise each coping strategy when confronted with stress on a four point scale (from 1 'I don't do this at all' to 4 'I do this a lot'). The subscales can be usefully grouped into three categories: 1) Problem focused coping, including active coping, planning and use of instrumental support; 2) Emotion focused coping, including positive reframing, acceptance and use of emotional support, humour and religious coping 3) dysfunctional coping, including behavioural disengagement, venting of emotions, denial, self distraction and self blame. Alphas for the three subscales in the current study were .82, .74 and .77 respectively indicating good reliability.

Psychopathology

Two scales were used to assess positive psychopathology / psychosis proneness: The paranoia scale (PS, Fenigstein & Vanable, 1992) and the Launay Slade Hallucination Scale (LSHS, adapted version, Morrison, Wells & Nothard, 2002). The paranoia scale is a self-report measure designed to measure paranoia in non-clinical samples and includes items that assess both ideas of persecution and reference. Each of the 20 items is rated on a 5-point Likert scale. Total scores range from 20 to 100, with

higher scores indicating greater paranoid ideation. The LSHS measures hallucination predisposition by assessing clinical and subclinical hallucinatory phenomena. It is a 24 item 4-point scale with higher scores indicating a greater frequency of hallucinatory experiences.

Negative psychopathology was assessed using the Revised Social Anhedonia Scale (SAS, Eckblad, Chapman, Chapman & Mishlove, 1982) which assesses deficits in the ability to experience pleasure. It is a 40-item scale with a true or false format and has been validated in student samples

Anxiety and Depression were assessed using the Hospital Anxiety and Depression Scale (HAD, Zigmond & Snaith, 1983). The HAD is a 10-item questionnaire frequently used in screening to provide an indication of anxiety and depression. Its subscales yield continuous variables which are considered a valid means of estimating severity of emotional disorder.

5.2.3. Data analysis

Data were analysed using SPSS version 15 and MPlus version 5.21 (Muthén & Muthén 2009), a structural equation modelling (SEM) software package. There were three stages of analysis: firstly we conducted principal components analysis to examine the structure of the ReSUS scale. Secondly, we explored the relationship of ReSUS subscales to symptomatology, coping and substance use using Pearson correlations. Finally we used SEM to test the hypothesis that reasons for use and coping mediate the relationship between symptoms and substance use. Some of the scales were skewed and were therefore log transformed. Where there were missing data, all available data were analysed and the sample size for each analysis is reported in the text or in the tables. As a large number of correlational analyses were conducted a conservative p value of .01 was adopted.

5.3. Results

5.3.1. Participant characteristics

Of the 221 participants, 55 (24.9%) identified a drug other than alcohol to be their 'main' substance, all of whom were confirmed to be probable drug abuse cases on the DAST. The remaining 166 (75.1%) met criteria for hazardous drinking according to the AUDIT. The majority (178, 80.5%) were using drugs and or alcohol at least

weekly. Average weekly alcohol consumption for those whose 'main' substance was alcohol was 22 units (range: 4 – 96).

Of the 55 drug users, 35 (63.6%) identified their main substance as cannabis, 9 (16.4%) reported it to be cocaine and 7 (12.7%) ecstasy. The remaining 4 reported amphetamines, benzodiazepines, hallucinogens and ketamine to be their main substance. The majority (39, 70.9%) reported using multiple substances.

Descriptive statistics for the main questionnaire measures can be found in table 1 below.

Table 1. Descriptive statistics for main questionnaire measures

	N	Min	Max	Median
Substance Use				
AUDIT	166	6.0	33.0	10.0
DAST	55	5.0	27.0	7.0
Reasons for Use				
Coping	221	0	2.9	0.3
Enhancement	221	0	3.0	0.8

	N	Min	Max	Mean (SD)
Coping				
Problem-focused	202	6.0	24.0	15.6 (3.9)
Emotion-focused	202	10.0	35.0	21.8 (4.7)
Dysfunctional	202	13.0	41.0	23.7 (5.5)
Psychopathology				
Hallucinations	197	23.0	92.0	36.9 (10.4)
Paranoia	198	20.0	85.0	38.7 (13.4)
Anhedonia	186	13.0	36.0	19.6 (3.2)
Anxiety	182	0	20.0	8.1 (4.3)
Depression	181	0	19.0	4.4 (3.4)

5.3.2. Reasons for use

On average, participants endorsed 13 reasons for use (SD = 6.9). The most frequently reported reasons for use (those items endorsed as being the reason for drinking/drug taking at least 'sometimes') were "When I am with friends and we want to have a good time"; "When I want to feel good, have a laugh or be happier"; "When I want to chill out or relax"; "When I want to feel drunk, stoned or high" and "When I am feeling happy and content with my life" with around four out of five participants endorsing them (see Table 2). Three quarters of participants (76.5%) reported using substances when they were feeling stressed and around half (48.4%) were using them when they felt depressed. Similar numbers (48%) also reported using drugs or alcohol when they were feeling anxious or tense. Very few people reported using substances for reasons relating to psychosis e.g. 'hearing voices' (3, 1.4%) or feeling suspicious/paranoid (27, 12.2%).

Principal components analysis with oblique (direct oblimin) rotation was used to assess the structure of the reasons for substance use questionnaire. In contrast to the three component structure reported in a sample of people with psychosis and comorbid substance use disorders (Gregg et al, 2009) the ReSUS was found to have two main components for this sample. The first component, which was almost identical to one reported by Gregg et al in the clinical sample, contained the items relating to negative affect and to psychiatric symptoms. The second component was a combination of components two and three from Gregg et al's earlier study and contained the items relating to positive affect and enhancement. Six items did not load (≤0.35) on either component and were therefore excluded from further analyses. Component loadings are shown in the pattern matrix (Table 3). Subscale scores for use in subsequent analyses were derived by averaging scores for the items that loaded onto each component. Cronbach's alphas for both subscales were high (.94 and .84 respectively) and item-total correlations were good ranging from .42 to .81 for the 'coping' subscale and from .42 to .68 for the 'enhancement' subscale.

Fifty eight participants completed the ReSUS questionnaire for a second time after a four week interval in order to assess its test- retest reliability. The scores at each time point were highly correlated: coping reasons for use: $r = .88$, $p < .001$; enhancement

reasons for use: r = .81, p <.001) and paired samples t tests were not significant indicating good stability over time.

The two ReSUS subscales were highly correlated (r(221) = .57, p <.001). The overwhelming majority of participants (186, 87.7%) scored more highly on the enhancement subscale than on the coping subscale.

The relationship of reasons for use to demographic variables

Age, gender and racial background were not related to reasons for use. Both marital status and accommodation status were related to reasons for use: single participants were more likely to use substances for enhancement purposes than those who were married or with a partner (t(180) = 3.92, p <.001). Similarly, those who lived in student halls of residence were more likely to use substances for these reasons than those who lived alone (F(3,178) = 4.08, p <.01).

The relationship of reasons for use to substance use

Reasons for drinking were related to level of alcohol consumption. There was a significant correlation between the average number of units consumed weekly and scores on both the enhancement subscale of the ReSUS (r(160) = .28, p < .001) and the coping subscale (r(160) = .42, p <.001). Interestingly *frequency* of alcohol consumption was negatively related to scores on the coping subscale (r(149) = -.31, p<.001) but was not related to enhancement reasons for use. Scores on both ReSUS subscales were positively associated with hazardous drinking as measured by the AUDIT (enhancement reasons for use: r(166) = .49, p <.001); coping reasons for use: r(166) = .60, p<.001).

Frequency of drug use was related to coping reasons for use (r(52) = 0.35, p <.01) but not enhancement reasons. DAST scores were positively correlated with coping reasons for use (r(55) = .350, p <.01) but again not with enhancement reasons.

Drug users scored more highly on the enhancement subscale than alcohol users (t(219) = 3.64, p <.001) with the users of 'other' substances scoring more highly on this scale than either cannabis or alcohol users (means = 17.9, 13.5 and 11.4 respectively, F(2,218) = 9.73, p <.001) but there was no difference between the groups on coping subscale scores.

Table 2. Most frequently endorsed reasons for substance use

	ReSUS items endorsed 'sometimes' 'often' or 'almost always'	
	N	**%**
When I am with friends and we want to have a good time	210	95.0
When I want to feel good, have a laugh or be happier	205	92.8
When I want to chill out or relax	191	86.4
When I want to feel drunk, stoned or high	191	86.4
When I am feeling happy and content with my life	174	78.7
When I am feeling stressed	169	76.5
When I want to feel more confident	167	75.6
When I want to 'feel different' or alter my state of mind	149	67.4
When I think about how good it tastes	137	62.0
When I want to feel sexy or increase my sexual enjoyment	135	61.1
When I feel excited about something	133	60.2
When I want to escape from my problems and worries	130	58.8
When I am bored and want something to do to pass the time	113	51.1
When I want to fit in with other people	112	50.7
When I am feeling depressed	107	48.4
When I feel anxious or tense	106	48.0
When I am angry at the way things have turned out	89	40.3
When I am feeling lonely	78	35.3
When I start to feel guilty about something	74	33.5
When I have trouble sleeping	73	33.0
When I want to feel more emotions	72	32.6
When I am having trouble communicating with others	69	31.2
When I want to feel more creative	68	30.8
When I feel under pressure from other people to use drugs / drink alcohol	66	29.9
When I want to stay awake, be more alert or energetic	65	29.4
When I am thinking about bad things that have happened to me in the past	62	28.1
When I unexpectedly find some alcohol /drugs	62	28.1
When I want to feel normal	60	27.1
When my thoughts are racing	57	25.8
When I have been drinking and think about using drugs (or vice versa)	55	24.9

(continued)

Table 2. *(continued)*

	ReSUS items endorsed 'sometimes' 'often' or 'almost always'	
	N	**%**
When I am feeling ashamed or bad about myself	52	23.5
When I want to feel more self aware	43	19.5
When I am having trouble thinking or concentrating	39	17.6
When I am experiencing unpleasant thoughts	38	17.2
When I need motivation to do things	36	16.3
When I am in pain	30	13.6
When I am feeling suspicious or paranoid	27	12.2
When I feel I have been discriminated against	17	7.7
When I am experiencing medication side effects	11	5.0
When I am hearing sounds or voices that other people can't hear	3	1.4

Table 3. Pattern matrix

	Component 1 Coping	Component 2 Enhancement
When I feel anxious or tense	.798	
When I am angry at the way things have turned out	.789	
When my thoughts are racing	.780	
When I am thinking about bad things that have happened to me in the past	.774	
When I am feeling depressed	.768	
When I am feeling suspicious or paranoid	.768	
When I am feeling lonely	.757	
When I am feeling ashamed or bad about myself	.751	
When I am experiencing unpleasant thoughts	.740	
When I start to feel guilty about something	.718	
When I am feeling stressed	.701	
When I have trouble sleeping	.691	
When I am having trouble thinking or concentrating	.671	
When I feel I have been discriminated against	.618	
When I am in pain	.600	
When I want to feel normal	.578	
When I want to escape from my problems and worries	.543	
When I am hearing sounds or voices that other people can't hear	.399	
When I am experiencing medication side effects	.398	
When I am having trouble communicating with others	.395	
When I want to feel good, have a laugh or be happier		.795
When I want to feel drunk, stoned or high		.666
When I want to stay awake, be more alert or energetic		.660
When I want to feel more confident		.621
When I want to feel sexy or increase my sexual enjoyment		.613
When I am with friends and we want to have a good time		.599
When I want to feel more emotions		.597
When I want to 'feel different' or alter my state of mind		.590
When I feel excited about something		.494
When I want to feel more self aware		.464
When I am bored and want something to do to pass the time		.389
When I want to fit in with other people		.363

Table 3. *(continued)*

	Component 1 'Coping'	Component 2 'Enhancement'
When I have been drinking and think about using drugs (or vice versa)		.356
When I need motivation to do things		.350
% variance explained	**35.5**	**9.0**
Cronbach's alpha	**.94**	**.84**

The relationship of reasons for use to psychopathology

There were significant relationships between both subscales of the ReSUS and all measures of psychopathology (Table 4). Coping reasons for use and enhancement reasons for use were both positively correlated with sub-clinical paranoia; hallucinations and anhedonia and with anxiety and depression.

Around one in 6 of the sample (15.4%) were either 'probable' or 'definite' cases on the HAD depression subscale. Cases scored more highly on the coping subscale of the ReSUS than those who were not cases ($t(179) = 5.21$, $p < .001$). There was no difference between cases on the enhancement subscale.

More than half (51.6%) of the participants were either 'probable' or 'definite' anxiety cases. Those who were probable or definite cases scored more highly on both ReSUS subscales: Coping subscale: ($t(180) = 5.0$, $p < .001$), enhancement subscale: ($t(180) = 3.1$, $p < .01$)

The relationship of reasons for use to coping

Problem focused coping was negatively correlated with the enhancement subscale of the ReSUS but was not related to the coping subscale. Emotion focused coping was not significantly related to either ReSUS subscale. Dysfunctional coping, however, was positively related to both subscales (see Table 4).

Table 4. Correlations between reasons for substance use, sub clinical psychopathology and coping strategies

	Coping reasons for use	**Enhancement reasons for use**
Paranoia scale (*n* = 198)	.480*	.481*
Launay hallucinations scale (*n* = 197)	.431*	.447*
Social anhedonia scale (*n* = 186)	.327*	.188*
HADs Anxiety (*n* = 182)	.453*	.319*
HADs Depression (*n* = 181)	.473*	.306*
Problem focused coping (*n* = 202)	-.170	-.243*
Emotion focused coping (*n* = 202)	-.107	-.155
Dysfunctional coping (*n* = 202)	.590*	.424*

**Correlation significant at p<.001*

5.3.3. The hypothesised model

We used Structural Equation Modelling (SEM) to test the hypothesis that reasons for use and coping mediate the relationship between symptoms and substance use since it allows the assessment of multiple pathways indicating direct and indirect effects, and allows for the simultaneous assessment of the multiple hypotheses. Whilst mediational relationships between observed variables can also be assessed through multiple regression procedures, SEM also explicitly allows the modelling of latent variables which we utilise in our model. Latent variables can allow for measurement error in the observed variables or, as used here, for the modelling of a latent construct measured by a number of observed variables which is subsequently included in the mediation model. MacKinnon (2008) provides an overview of mediation analysis with SEM and for latent variable mediation models.

MPlus provides several tests of model fit, which we use to assess the agreement between the hypothesised model and the observed data. The chi squared test is appropriate for models estimated using maximum likelihood, where the null hypothesis is that the hypothesised model fits the data, so a non-significant chi square statistic indicates that the model is an acceptable fit for the observed data. Additional measures which we also used are: the Akaike information criteria (AIC,

where a lower value indicates a better fit); the Bayesian information criteria (BIC, where again a lower value indicates a better fit); the standardised root mean square residual (SRMR, a value of less than .05 indicates good fit); the root mean square error of approximation (RMSEA, <.06 is good), and the Bentler comparative fit index (CFI, >.95 is good). (Kline 2005; Muthén & Muthén 1998)

Based on the separate hypotheses under investigation, we formed a theoretically hypothesised model, tested it on the data and assessed its validity using the outlined fit indices. If the hypothesised model did not fit our data, it was adjusted following inspection of modification indices provided by MPlus. We first estimated the hypothesised model for our entire sample, which includes subjects whose main substance of abuse was either alcohol or drugs. We then stratified the sample and tested the model separately in the alcohol and drug groups to examine whether our hypotheses held. We adjusted the model to allow for the different outcome ratings according to the respective groups: the AUDIT was used as the sole observed outcome in the alcohol group, and the DAST used as the sole observed outcome in the drugs group.

We used AUDIT and DAST scores to define a latent variable which measures underlying substance use (of any substance). The model tests the proposed mediation hypotheses by assuming there are no direct effects of psychopathology on coping strategies, with indirect effects acting through reasons for use; no direct effect of reasons for use except through coping strategies and no direct effect of psychopathology on substance use. The absence of direct effects (assuming complete mediation) are strong assumptions we aimed to use our hypothesised model to test.

We allowed the five psychopathology scales to be correlated, and also allowed for correlation between the two reasons for use and three coping subscales. These correlations do not alter the interpretation of the model.

The results from the fit indices indicate that the hypothesised model did not fit the data: $\chi^2(31, N=221)=122.31$, $p<.0001$, SRMR=.08, RMSEA=.12 (90% Confidence interval=.09-.14), CFI=.83, AIC=12074.54, BIC=12275.04. Standardised coefficients indicated that whilst many of the relationships were statistically significant, several were not. We recognised that some of our assumptions regarding the absence of

direct effects may not hold, and examined the modification indices to give an indication of where theoretically valid direct effects could be added to the model to improve its fit. These indices suggested the following direct paths: from enhancement reasons for use to substance use; from anxiety, paranoia and hallucinations to dysfunctional coping; and from paranoia and depression direct to substance use.

Alternative model for whole sample

The alternative model considered the paths from the original hypothesised model with the addition of the paths highlighted above. The fit of this alternative model was very improved relative to the hypothesised model: $\chi^2(25, N=221)=49.40$, p=.003, SRMR=.06, RMSEA=.07 (90% Confidence interval=.04-.09), CFI=.96, AIC=12013.64, BIC=12234.52. The χ^2 was still significant, the SRMR, RMSEA and CFI were outside the range for a good fit, although both the AIC and BIC were lower than the respective values for the hypothesised model.

Final model for whole sample

The modification indices did not indicate any theoretically justifiable additional pathways to incorporate into the alternative model. Alternatively, we removed non-significant direct effects from the alternative model, and where this lead to variables which were no longer predictive of other variables in the system, these were removed. This was the case for anhedonia symptoms, and two factors of the brief COPE scale (emotion focused and problem focused coping).

The final model is shown in figure 2. The fit of this final model was very good: $\chi^2(13, N=221)=14.08$, p=.379, SRMR=.03, RMSEA=.02 (90% Confidence interval=.00-.07), CFI=.99, AIC=8855.41, BIC=8994.73. The χ^2 was non-significant, the SRMR, RMSEA and CFI were inside the range indicating a good fit.

The model shows that paranoia and depression both have a direct effect on substance use as well as operating through reasons for use and dysfunctional coping. Paranoia operates through both coping and enhancement reasons for use whilst depression operates through coping reasons alone. Anxiety and hallucinations do not directly link to substance use: both have a direct effect on dysfunctional coping. Anxiety also has an impact on substance use through coping reasons for use. Hallucinations have

an impact through both coping reasons and enhancement reasons and also link directly to dysfunctional coping. Anhedonia does not have any direct effects in the final model. Paranoia and hallucinations are the only symptoms associated with enhancement reasons for use which in turn has a direct effect on substance use and is not mediated by coping.

Results of Models in drug and alcohol groups

We fitted the hypothesised model separately in the subgroups defined by those subjects whose main substance of abuse was drugs and alcohol respectively. We used the DAST as outcome in the model for the drug group, and the AUDIT for the alcohol group. As with the whole sample, the hypothesised model did not fit the data well in either subgroup.

We then fitted the final model from the whole sample in each of the groups and found there was evidence to support this model in both groups, in particular the alcohol using subsample (χ^2 (7, N=161)=13.05, p=.071, SRMR=.03, RMSEA= .07 (90% CI=.00-.13), CFI=.98, AIC = 5536.59, BIC = 5651.73) where the majority of paths were significant (see figure 3). There were less significant paths when the final model was fitted in the drug subsample (see figure 4) although the overall model did fit the data (χ^2 (7, N=55)=13.23, p=.07, SRMR=.05, RMSEA=.14 (90% CI=.00-.23), CFI=.92, AIC = 2094.80, BIC = 2169.07).

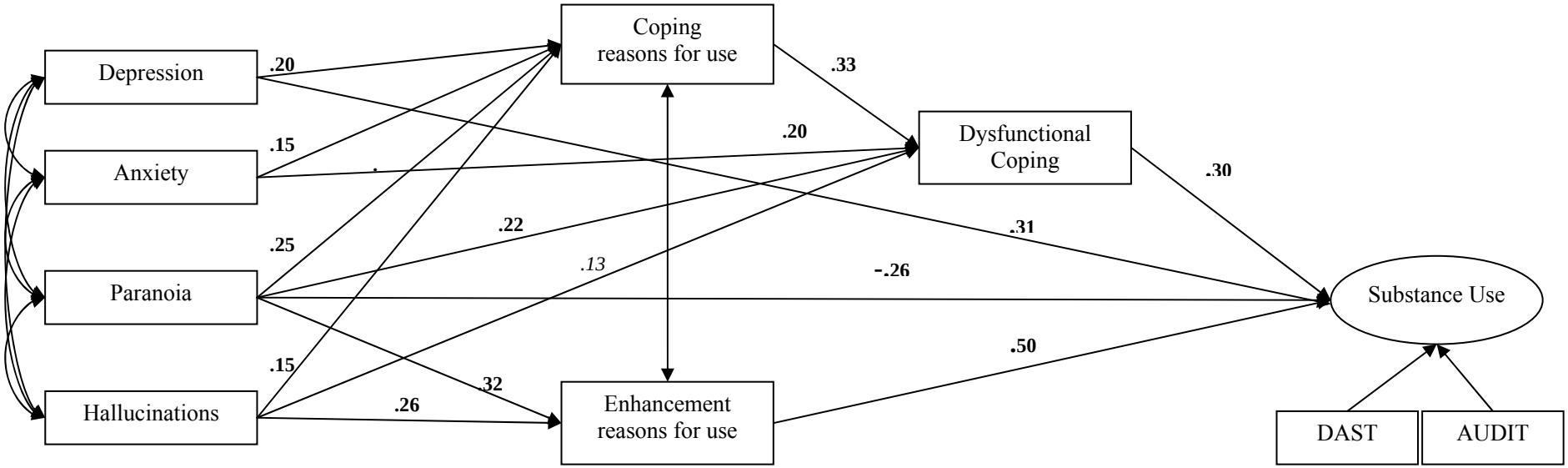
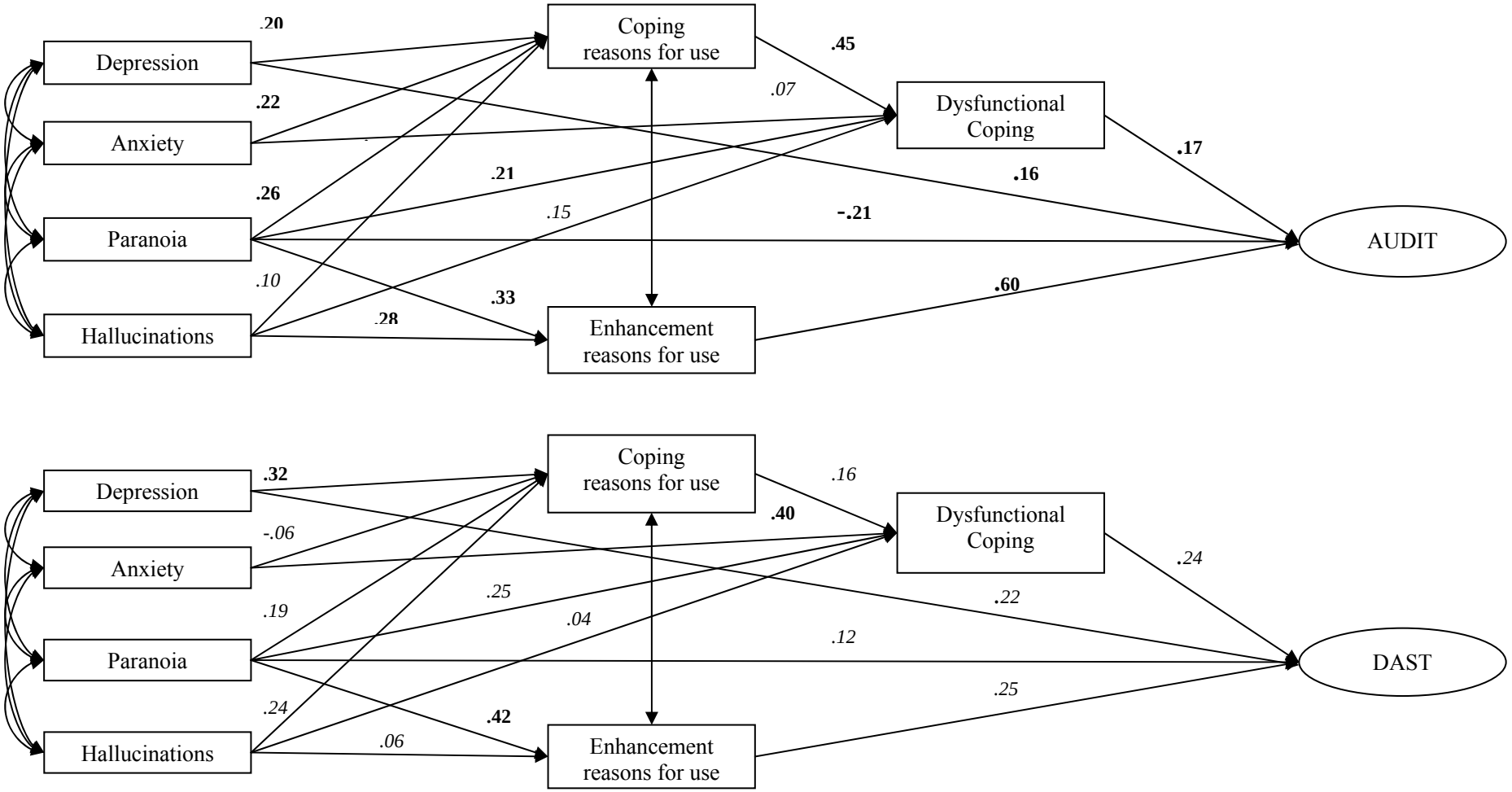


Figure 2. Final model on whole sample. Numerical values represent standard path coefficients. Paths with numerical values in bold were significant ($p < .05$)



Figures 3 & 4. Final model on alcohol (n = 166) and drug (n = 55) using subsamples. Numerical values represent standard path coefficients. Paths with numerical values in bold were significant ($p < .05$)

5.4. Discussion

We investigated reasons for substance use and examined their relationship to psychopathology, substance use and coping strategies. In line with earlier research in both clinical and non-clinical samples use we found that participants used drugs and alcohol for mainly positive reasons. They used substances socially: to have a good time with friends; to chill out and relax; to feel good and for intoxication purposes. Significant numbers also used substances when they were feeling stressed, depressed, anxious or tense. As might be expected in a non-clinical sample, very few participants reported using substances for reasons relating to psychosis. The substance users in this sample reported fewer reasons for use (13 on average) than those in our earlier sample of people with psychosis (Gregg, Barrowclough & Haddock, 2009) where the average number of reasons for use endorsed was 24.

The two factors derived from the ReSUS questionnaire were different to those obtained in our earlier clinical sample but were in line with those identified elsewhere in the non-clinical literature, particularly the alcohol literature, which broadly categorises reasons for use as positive (enhancement reasons) or negative (coping or 'escape' reasons). In our clinical sample the third component, containing expansion reasons for use 'individual enhancement', was largely endorsed by drug users, specifically stimulant and opiate users of which there were comparatively few in this non-clinical sample. It is possible that we would have replicated the three factor solution if we had had more drug users in our sample. Like Gregg et al (2009) we found that drug users scored more highly on the subscale containing the individual enhancement/expansion items of the ReSUS than alcohol users (with users of substances other than cannabis endorsing the most reasons for use of this type).

Reasons for use were significantly related to substance use but the relationship varied according to the type of substance used. For alcohol users, coping reasons for use were positively associated with consumption of alcohol units but negatively associated with frequency of use which may well indicate that those who were drinking to cope were binge drinking. Enhancement reasons for use were related to the amount of alcohol consumed but not to the frequency of use. This is in line with Williams & Clark's (1998) finding that 'escape drinking' predicts binge drinking and 'social drinking' predicts amount of alcohol consumption. For drug users, coping

reasons for use were related to frequency of drug use but enhancement reasons were not.

As predicted, reasons for use were related to subclinical psychopathology. Both subscales of the ReSUS were positively correlated with paranoia, hallucinations, anhedonia, anxiety and depression. Participants who were classed as anxious or depressed endorsed more coping reasons for use than those who were not. Anxious participants also endorsed more enhancement reasons for use than those who were not anxious, perhaps reflecting the use of drugs and alcohol to increase positive affect in social situations. Reasons for use were also related to coping strategies, specifically dysfunctional coping. Like Cooper et al (1988), we found that coping reasons for use were related to maladaptive (i.e. dysfunctional) but not adaptive (problem or emotion focussed) coping strategies indicating that the use of substances as a coping mechanism is related to the use of dysfunctional coping strategies generally.

We tested a mediational model of substance use in which both reasons for use and coping strategies were hypothesised to mediate the link between psychopathology and substance use. Results were consistent with previous research showing that substance use is related to psychopathology in non-clinical samples (e.g. Mass et al, 2001; Miller et al, 2002; Nunn et al, 2001) and with the literature linking coping motives to substance use (e.g. Britton, 2004; Cooper, 1994; Cooper et al, 1995; Cox, Hosier, Crossley, Kendall & Roberts, 2006; Lee, Neighbors & Woods, 2007).

However, the model as originally hypothesised did not fit the data well and the assumption of complete mediation was not supported. A number of direct paths between variables were required in order to obtain an acceptable fit in subsequent models: from anxiety, paranoia and hallucinations direct to dysfunctional coping (bypassing reasons for use); and from paranoia and depression direct to substance use (bypassing both reasons for use and coping styles). Furthermore, the removal of non-significant direct effects lead to the removal of two factors of the brief COPE scale (emotion focused and problem focused coping) and the social anhedonia scale as they were no longer predictive of other variables in the model.

Thus the final model revealed that some, but not all of that relationship between psychopathology and substance use was mediated by reasons for use and dysfunctional coping. The direct path from depression to substance use indicates that for some people, the effect of depression alone may be strong enough to lead to substance use. This is consistent with a significant literature linking depression to substance use (Swendsen & Merikangas, 2000). The model also suggested a direct effect of paranoia on substance use with higher paranoia leading to *decreased* use for some people, replicating an earlier study by Larrison et al (1999) which reported substance use (alcohol) to be related to lower delusional conviction in a non-clinical sample. One possible explanation for this may be that some people experiencing paranoia may be less likely to participate in social situations where substance use takes place or alternatively, they may be actively reducing their use because paranoia is perceived as a consequence of use. The three other unexpected direct effects (from anxiety; paranoia and hallucinations to dysfunctional coping, bypassing reasons for use) may reflect a measurement issue for coping reasons for use. Reasons for use, like all other study measures, were self reported and in order to report coping motives, participants would need to recognise that they used substances when their mood was low or when they were experiencing other distressing states. Not all participants would be able to recognise this association and thus may be more likely to report general dysfunctional coping behaviours than endorse specific coping reasons for use. Some support for this speculation comes from the bivariate correlations showing slightly stronger relationships between dysfunctional coping and paranoia, hallucinations and anxiety (r = .56, .53 and .52 respectively) than between coping reasons for use and paranoia, hallucinations and anxiety (r = .48, .43 and .45 respectively).

In line with our hypotheses anxiety and hallucinations did not have a direct effect on substance use and had all of their effect through reasons for use and dysfunctional coping: anxiety through coping reasons alone and hallucinations through both coping reasons and enhancement reasons. Additionally, the two different categories of reasons for substance use impacted on substance use via different paths: Coping reasons for use had their effect on substance use solely through the use of dysfunctional coping: people who reported using drugs and alcohol to cope with negative affect were more likely to use dysfunctional coping strategies in relation to

stress generally. Enhancement reasons for use had a direct effect on substance use, with higher scores on this factor being associated with more problematic substance use. Thus coping reasons for use were not the sole determinants of use.

The final model fitted the data when the sample was stratified into drug and alcohol using subgroups but provided a better fit in the alcohol subsample where, as in the whole sample, coping and enhancement reasons had separate paths to problematic use: coping reasons were mediated by dysfunctional coping strategies whereas enhancement strategies had a direct relationship. There were fewer significant paths in the drug using group and no variables predicted problematic drug use which may reflect reduced power (the sample size was reduced to 55 for these analyses).

5.4.1. Limitations

We utilised structural equation modelling but because of the cross sectional design we were not able to determine causal relationships. The use of self report questionnaires to assess all constructs introduces the possibility of self-reporting and recall biases and common method variance. In the absence of a valid and reliable measure to assess substance use patterns (for example the timeline followback interview, TLFB, Sobell and Sobell, 1992) we used AUDIT and DAST scores to define a latent variable reflecting underlying substance use (of any substance). Thus our outcome measure reflects problematic drug or alcohol use but does not take into account actual levels of drug and alcohol use (in terms of either amount used or frequency of use) which is a significant limitation. This was also a self-selecting student sample, the majority of whom were young female alcohol users. Males and drug users, particularly users of drugs other than cannabis were under-represented and the findings may not generalise well to more diverse, community or clinical samples. Future research should therefore seek to examine the model in these populations. Finally, the models are dependent on a number of assumptions, the key one being a lack of unmeasured confounders which might explain the relationships as explored in the final model (Emsley, Dunn, & White 2010). Future research should seek to understand identify additional factors which may impact on the model

Despite the limitations outlined above, this was the first study to identify reasons for substance use and coping strategies as mediators of the relationship between

substance use and psychopathology and is an important step in understanding the association between substance use and harmful consequences of use. According to the mental health continuity hypothesis, hallucinations, delusions, anxiety and depression are dimensional phenomena lying on a continuum with normal experiences and our findings may therefore suggest a potential pathway for the development and maintenance of mental health problems and substance use comorbidity. The results support the further exploration of these relationships in samples with psychosis.

5.4.2. Clinical implications

If the relationships reported here were replicated in a clinical sample this would have important implications for the development of cognitive–behavioural interventions. Results suggest that interventions which emphasise the use of different, more adaptive coping strategies and the development of a wider repertoire of enhancement skills could potentially help substances users with and without psychosis abstain from or reduce their substance use.

Chapter 6

A motivational model of substance use in Psychosis: the mediating effects of reasons for use and coping

Abstract

This paper uses structural equation modelling (SEM) to test the hypothesis that distress, self reported reasons for substance use and coping strategies mediate the relationship between psychopathology and substance use in a sample of people with psychosis and comorbid substance use disorder. As predicted, SEM revealed that distress in relation to symptoms mediated the relationship between psychopathology and reasons for use and that in turn, reasons for use mediated the relationship between distress and coping strategies. However, in contrast to our predictions, coping strategies did not mediate the relationship between reasons for use and substance use; instead, there was a direct effect of reasons for use on substance use. Specifically, coping reasons for use predicted the negative consequences associated with substance use. Social enhancement and individual enhancement reasons for use were not related to problematic substance use suggesting that it may be only those people using substances to cope with distressing psychological symptoms who are at risk of problematic substance use. The clinical implications of these findings are discussed.

6.1. Introduction

There is now a substantial literature on the relationship between substance use and psychosis. Individuals with psychosis are more likely to use substances than people in the general population (Regier et al, 1990) and they tend to experience greater negative consequences as a result (Maslin, 2003). Four broad models have been proposed to explain the reasons for this increased comorbidity (see Gregg, Barrowclough & Haddock, 2007 for a review): namely: i) substance use causes psychosis; ii) substance use is a consequence of psychosis; iii) another common factor (perhaps genetics, neuropathology or social and environmental factors) underpins both disorders and iv) psychosis and substance use interact and maintain each other. The bulk of the existing research literature has focused on the first two explanations of aetiology but results have not been consistent. There is evidence from cohort studies to suggest that cannabis, but not other substances, may have a causal role in the development of psychosis and schizophrenia (e.g. Ferdinand et al, 2005; Zammit, Allebeck, Andreasson, Lundberg & Lewis, 2002). The self report literature indicates that although coping motives are not the principal motives of use there are many people with psychosis who report using substances to alleviate negative affective states and cope with the symptoms of psychosis (e.g. Addington & Duchak, 1997; Gearon, Bellack, Rachbeisel & Dixon, 2001; Goswami, Mattoo, Basu & Singh, 2004; Gregg, Barrowclough & Haddock, 2009; Spencer, Castle & Michie, 2002) providing some support for a self medication model of substance use.

It is likely that there are many risk factors involved in substance use in psychosis: genetic vulnerability; demographic and contextual factors; individual differences in personality, coping and social functioning have all been associated with increased comorbidity but there are very few well developed multiple risk factors models. Blanchard, Brown, Horan & Sherwood (2000) propose an affect regulation model of substance use which suggests that people with schizophrenia use drugs and alcohol to cope with negative emotions and problems. Their model assumes that stable personality traits, stress and coping are the factors underlying long term risk for substance use. Barrowclough et al (2007) also highlight the role of coping in their model of substance use maintenance in psychosis which, building on Marlatt and Gordon's social-cognitive model of addiction (Marlatt & Gordon, 1985) and Blanchard et al's (2000) affect regulation model proposes that certain situations and

cues trigger drug or alcohol related thoughts which in the absence of alternative coping strategies and in the context of low self efficacy for resisting make the person vulnerable and more likely to use substances. Continued substance use is assumed to reinforce learned expectancies of the positive benefits of use and a vicious feed forward cycle of maintenance and escalating problems may develop.

In this model coping behaviours function as a protective factor in high-risk situations, that is, situations in which there is an increased desire to drink alcohol or use drugs. These situations may be external (e.g. social pressure) or internal (e.g. unpleasant emotions). For people with psychosis these high-risk situations may be related, if not directly to psychotic symptoms, then to some of the negative consequences associated with the disorder such as dysphoria and distress (Barrowclough et al 2007; Blanchard et al 2000). Also included in the model are internal stressors and external stressors, specifically interpersonal conflicts that may mediate the relationship between substance use and psychopathology (Barrowclough, Ward, Wearden & Gregg, 2005; Linszen, 1997).

The existing research confirms that people with psychosis often experience difficulty coping with both minor and major stresses (Corrigan & Toomey, 1995; Mueser, Valentiner & Agrestra, 1997) and that they may possess a relatively limited repertoire of coping strategies (Rollins, Bond & Lysaker, 1999). A number of studies have investigated coping in relation to psychotic symptoms (e.g. Falloon & Talbot, 1981; Kinney, 1999; Lobban, Barrowclough & Jones, 2004), affective symptoms (e.g. Brier & Strauss, 1983) and negative symptoms (e.g. Mueser, Valentiner & Agresta, 1997; Rollins et al, 1999) and have demonstrated that people with psychosis appraise their symptoms as taxing and employ a diverse range of cognitive and behavioural strategies to attempt to control or cope with their symptoms. There is evidence to show that those experiencing greater distress utilise a greater number of coping strategies (Singh, Sharan & Kulhara, 2003) and that having a greater repertoire of strategies is more effective than relying on just one strategy (Philips et al, 2009)

From the perspective of social learning theory, the coping functions of a substance are learned through initial exposure to that substance and in subsequent use in different situations (Wills & Hirky, 1986). It is the positive beliefs held about the

effects of a substance, coupled with inefficient coping resources (Abrams & Niaura, 1987) which determine their use. The mechanism through which expectancies about substance use impact on substance use is thought to be motives / reasons for use. Motives are thought to be the pathway through which more distal influences, such as personality characteristics or expectancies are mediated (e.g. Cooper, 1994; Cooper, Frone, Russell, & Mudar, 1995; Cox & Klinger, 1988). The importance of coping motives is well established in non-clinical samples (e.g. Britton, 2004; Cooper, 1994; Cooper et al, 1995; Cox, Hosier, Crossley, Kendall & Roberts, 2006; Lee, Neighbors & Woods, 2007) and there is a growing body of evidence linking coping motives to problematic substance use in samples with psychosis (e.g. Gregg, Barrowclough & Haddock, 2009; Spencer, Castle & Michie, 2002).

The aim of the current study was to test a model of substance use maintenance in psychosis in order to identify the individuals most at risk of problematic drug or alcohol use. Using Barrowclough et al's (2007) model as a starting point we aimed to test the hypothesis that the key factors mediating the link between symptoms and substance use are reasons for use and coping strategies. In our previous research with University students (see previous chapter) we found that both coping and enhancement reasons for use mediated the relationship between sub-clinical symptoms and problematic substance use. Enhancement reasons had a direct effect on substance use outcome whereas coping reasons were wholly mediated by the use of dysfunctional coping strategies. We include distress in relation to symptoms as a mediating factor between symptoms and reasons for use recognising that it may be distress in relation to symptoms, rather than symptoms per se that motivate the use of substances to cope. We therefore hypothesised that greater distress in relation to symptoms would be associated with more coping reasons for use; that more coping reasons for use would be associated with increased use of dysfunctional coping strategies and / or decreased use of more adaptive coping strategies and that this in turn, would predict problematic substance use.

6.2. Method

6.2.1. Participants

A total of 82 participants took part in the study, all of whom were taking part in a

randomised controlled trial involving patients with psychosis and substance use disorder (The MIDAS trial: Motivational Interventions for Drugs & Alcohol misuse in Schizophrenia, Barrowclough et al, in press). Participants in the trial (n = 327) were recruited from six mental health trusts in Greater Manchester, Lancashire and South London, UK between October 2004 and April 2007. Participants were included if they were aged over 16 years; in current contact with mental health services; had a current clinical diagnosis of non-affective psychotic disorder (ICD-10 and/or DSM-IV); DSM-IV diagnosis (First, Spitzer, Gibbon & Williams, 2002) of drug and/or alcohol dependence or abuse; met minimum levels of alcohol (exceeding 28 units for males, 21 units for females, on at least half the weeks in the past three months) or illicit drug use (use on at least two days per week in at least half the weeks in the past three months); no significant history of organic factors implicated in the aetiology of psychotic symptoms; were English speaking and of fixed abode (including B&B or hostel). The 82 participants included in this study were the last people recruited to the trial (consecutive referrals between March 2006 and April 2007).

6.2.2. Measures

Psychopathology

The Positive and Negative Syndrome Scale (PANSS; Kay, Fiszbein & Opler, 1987) was used to assess symptom severity. The PANSS is a 30 item structured clinical interview which is used to assess severity of positive symptoms, negative symptoms and general psychopathology in schizophrenia. Items are rated on 7-point Likert scales (0 absent – 7 severe) which can be summed to provide a total severity score. The psychotic symptom rating scales (PSYRATS, Haddock, McCarron, Tarrier & Faragher, 1999) were used to assess auditory hallucinations and delusions and the intensity and amount of distress caused by these symptoms. High PSYRATS scores indicate more severe and less controllable symptoms. The Global Assessment of Functioning scale (GAF, American Psychological Association, 1994) was used to rate the social, occupational and psychological functioning of participants. The lower the GAF score, the higher the degree of impairment. Depression was assessed using the Calgary depression scale (CDSS, Addington, Addington & Schissel, 1990) an interview which assesses depressive symptoms separate from positive, negative and extrapyramidal symptoms in people with schizophrenia.

Substance use

The structured clinical interview (SCID-IV) substance use disorders module was used to differentiate substance abuse and dependence disorders. Data on current substance use behaviour (type and frequency of use over the preceding 30 days) was collected using the timeline follow back interview (TLFB, Sobell and Sobell, 1992). Perceived consequences of substance use were assessed using the 15 item version of the Inventory of Drug Use Consequences (InDUC, Blanchard, Morgenstern, Morgan, Lobouvie & Bux, 2003), a self administered assessment of the recent negative consequences of substance use. In addition, the 20 item drug abuse screening test (DAST, Skinner, 1982) and the alcohol use disorders identification test (AUDIT, Saunders, Aasland, Babor, de la Fuente and Grant, 1993) were used to determine the extent to which respondents were using drugs and or alcohol problematically.

Substance use questionnaires were completed with reference to the *main* substance used: this was the substance participants met DSM-IV abuse/dependence criteria for. Where participants met DSM-IV abuse/dependence criteria for more than one substance, the *main* substance was the substance identified by the participant to be most problematic or if the person did not make such a discrimination, then the most frequently used.

Reasons for substance use

The reasons for substance use in schizophrenia questionnaire (ReSUS, Gregg, Barrowclough & Haddock, 2009) was used to assess the situations in which participants were using their *main* substance. The questionnaire consists of 40 items describing situations in which people drink alcohol/use drugs. Participants were asked to indicate whether they used their main substance in that situation "never", "sometimes", "often" or "almost always". The ReSUS has three subscales 'coping with distressing emotions and symptoms', 'social enhancement and intoxication' and 'individual enhancement' each of which has good internal reliability (with alphas of .91, .81 and .82 respectively).

Coping

Coping strategies were assessed using the brief COPE (Carver, 1997). The brief COPE yields fourteen distinct coping strategies. Respondents indicate the degree to which they typically utilise each coping strategy when confronted with stress on a

four point scale (from 1 ‘I don’t do this at all’ to 4 ‘I do this a lot’). The subscales can be usefully grouped into three categories: 1) Problem focused coping, including active coping, planning and use of instrumental support; 2) Emotion focused coping, including positive reframing, acceptance and use of emotional support, humour and religious coping 3) dysfunctional coping, including behavioural disengagement, venting of emotions, denial, self distraction, self blame and substance use. Alphas for the three subscales in the current study were .81, .75 and .73 respectively indicating good reliability.

All assessments were completed at baseline, before randomisation to the study’s treatment arms took place.

6.2.3. Data analysis

Analyses were conducted using Mplus version 5.21 (Muthén & Muthén 2009), a structural equation modelling (SEM) software package. Additional data management was conducted in SPSS version 15. We used SEM to test the hypotheses, since it allows the assessment of multiple pathways indicating direct and indirect effects, and allows for the simultaneous assessment of the multiple hypotheses. Mplus provides several tests of model fit, which we use to assess the agreement between the hypothesised model and the observed data. The chi squared test is appropriate for models estimated using maximum likelihood, where the null hypothesis is that the hypothesised model fits the data, so a non-significant chi square statistic indicates that the model is an acceptable fit for the observed data. Additional measures which we also used are: the Akaike information criteria (AIC, where a lower value indicates a better fit); the Bayesian information criteria (BIC, where again a lower value indicates a better fit); the standardised root mean square residual (SRMR, a value of less than .05 indicates good fit); the root mean square error of approximation (RMSEA, <.06 is good), and the Bentler comparative fit index (CFI, >.95 is good). (See Kline, 2005, and Muthén & Muthén 1998). Based on the separate hypotheses under investigation, we formed a theoretically hypothesised structural equation model, fitted it onto the data and assessed its plausibility using the outlined fit indices. If the hypothesised model did not fit our data it was adjusted through inspection of modification indices provided by Mplus. We first estimated the hypothesised model for our entire sample, which includes subjects whose main

substance of abuse was either alcohol or drugs. We then stratified the sample and tested the model separately in the alcohol and drug groups to examine whether our hypotheses held. We adjusted the model to allow for the different outcome ratings according to the respective groups: the AUDIT was used as the sole observed outcome in the alcohol group, and the DAST used as the sole observed outcome in the drugs group. Before fitting the data we computed Pearson correlations for all of the variables in order to identify whether any variables should be excluded and confirm that the observed relationships were in the direction expected.

6.3. Results

6.3.1. Participant characteristics

The sample consisted of 72 (87.8%) males and 10 (12.2%) females with a mean age of 37.5 years (SD = 9.6). The majority (65, 79.3%) described themselves as white and most were unemployed (80, 97.6%). Two out of five (34, 41.5%) were living alone at the time of the assessments, almost one third (26, 31.7%) were living with a partner or other family members and the remainder (22, 26.8%) were living in shared accommodation (including hostels) with non family members. The average age at which participants left full time education was 15.9 (SD = 1.4).

The majority of participants (68, 82.9%) had a diagnosis of schizophrenia. Other diagnoses included drug induced psychosis (5, 6.1%), psychosis not otherwise specified (5, 6.1%) and schizoaffective disorder (4, 4.9%). Average illness duration was 12.2 years (SD 9.3).

On average, participants had been using their *main* substance (MS) for 13.6 years (SD = 9.6). Four out of five (66, 80.5%) met DSM IV criteria for substance use dependence whilst one in five (16, 19.5%) met criteria for substance abuse. For just over half (43, 52.4%) the MS was alcohol. Cannabis was the MS for one quarter (21, 25.6%), followed by amphetamine (7, 8.5%), cocaine (7, 8.5%) and heroin (6, 2.6%). On average, participants had used their MS on 20 days of the previous 30 days (SD = 9.6). Poly substance use was common with 48 participants (58.5%) using two or more substances (including alcohol).

6.3.2. The hypothesised model

Pearson correlations (Tables 1 and 2) revealed that the amount and frequency of substance use over the last 30 days (as measured by the timeline followback method, TLFB) was not related to PANSS symptoms, depression, distress in relation to symptoms, reasons for substance use or coping. However negative consequences of use (as measured by the Inventory of Drug Use Consequences, InDUC) were related to both distress in relation to delusions and to depression: Higher levels of distress and depression were related to more negative consequences from substance use. We therefore included InDUC scores as the sole outcome variable in our model. GAF disability was related to the three PANSS subscales but to no other variables and was therefore excluded. Demographic variables (age, gender, accommodation status, employment) were not related to any of the variables in the hypothesised model and were not included. The final hypothesised model therefore contained thirteen independent variables: five psychopathology variables; two distress variables; the three components of the ReSUS scale and the three coping subscales (Figure 1).

The hypothesised model (Figure 1) tests the proposed mediation hypotheses by assuming that there are no direct effects of psychopathology on reasons for use, with indirect effects acting through distress in relation to symptoms; no direct effect of distress on coping strategies except through reasons for use; no direct effect of reasons for use on substance use except through coping strategies and no direct effect of psychopathology on substance use. The absence of direct effects (assuming complete mediation) are strong assumptions that we aimed to use our hypothesised model to test. We allow variables at each stage to co vary – implicitly acknowledging that there may be unmeasured patient specific factors which are not explicitly included in the model.

The results from the fit indices indicates that the hypothesised model did not fit the data ($\chi^2(47, N=82) = 81.27$, $p<.002$, SRMR=.08, RMSEA=.09 (90% Confidence interval=.058-.128), CFI=.86, AIC=6039.26, BIC=6212.55. We therefore examined the modification indices for plausible direct effects to be included in the model. These indices suggested two additional paths: from coping reasons for use and social enhancement reasons for use to InDUC scores.

Table 1. Associations between substance use and symptoms

	TLFB (days abstinent)	**INDUC**	**PANSS positive**	**PANSS negative**	**PANSS general**	**AH distress**	**Del distress**	**GAF symptoms**	**GAF disability**
INDUC	.093								
PANSS positive	-.010	.032							
PANSS negative	-.114	.072	.258*						
PANSS general	.003	.151	.573**	.332**					
AH distress	-.009	.165	.342**	.006	.206				
Del distress	.044	.249*	.273*	.225*	.321**	.366**			
GAF symptoms	.042	.001	-.740**	-.227*	-.563**	-.323**	-.390**		
GAF disability	.179	.137	-.383**	-.236*	-.404**	-.143	-.100	.485**	
Calgary depression	-.019	.242*	.317**	.245*	.669**	.273*	.383**	-.361**	-.208

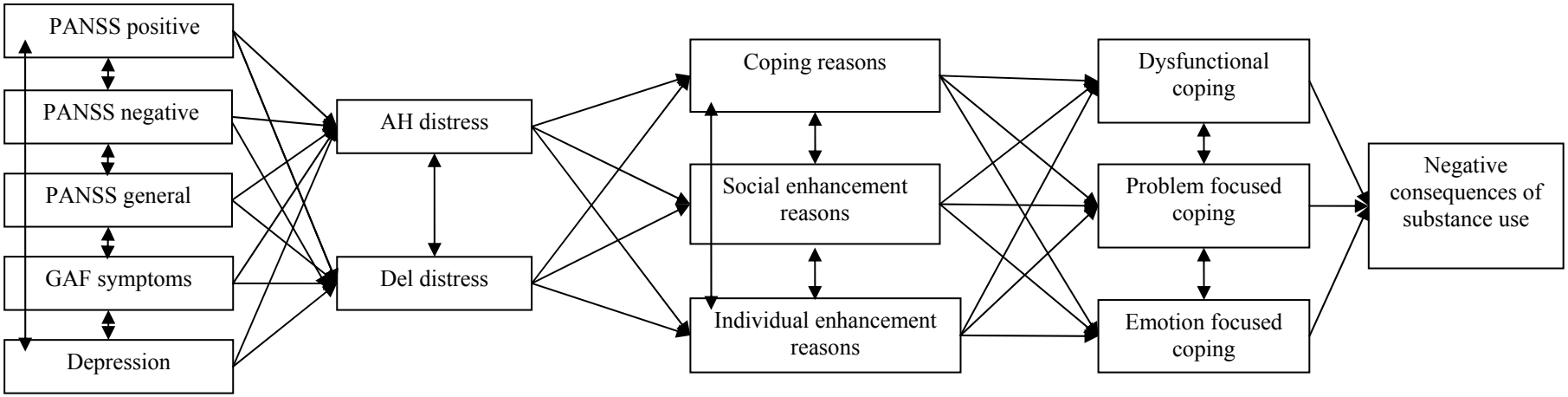
*$p < .05$, **$p < .01$

Table 2. Associations between symptoms and reasons for use and coping

	PANSS positive	PANSS negative	PANSS general	AH distress	Delusions distress	GAF symptoms	GAF disability	Calgary depression
ReSUS 1								
Coping with emotions and symptoms	.171	.140	.310**	.343**	.308**	-.247*	-.102	.388**
ReSUS 2								
Social enhancement	.014	-.004	.031	.045	.158	-.043	.032	-.067
ReSUS 3								
Individual enhancement	.086	-.025	-.013	.017	.004	-.005	.119	-.022
COPE 1								
Problem focused coping	-.116	-.265*	-.113	-.027	.096	.071	.153	-.002
COPE 2								
Emotion focused coping	.164	-.227*	-.119	.088	-.012	-.087	.117	-.080
COPE 3								
Dysfunctional coping	.212	.027	.292**	.273*	.139	-.253*	-.102	.339**

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

Figure 1. Hypothesised Model



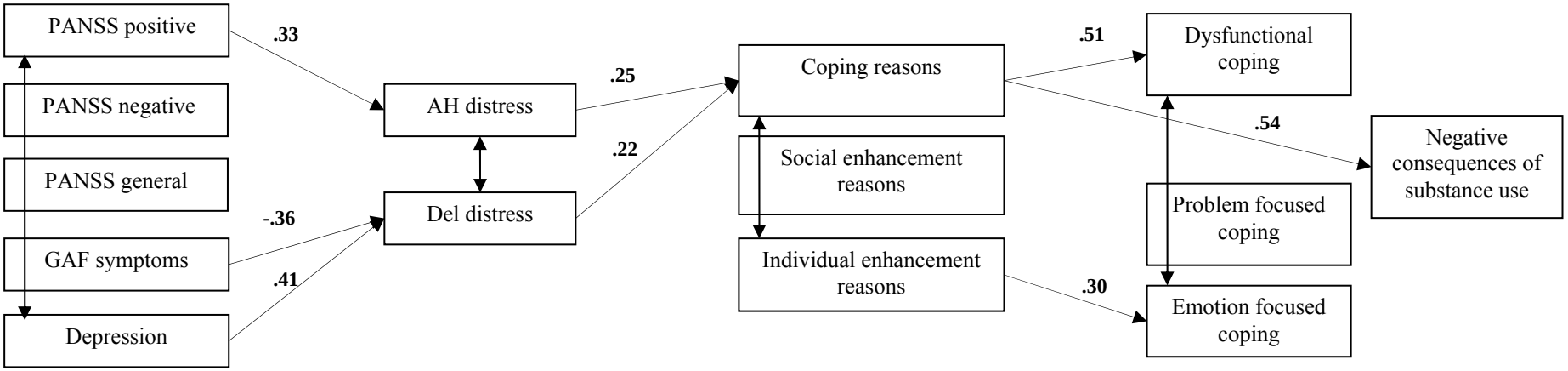
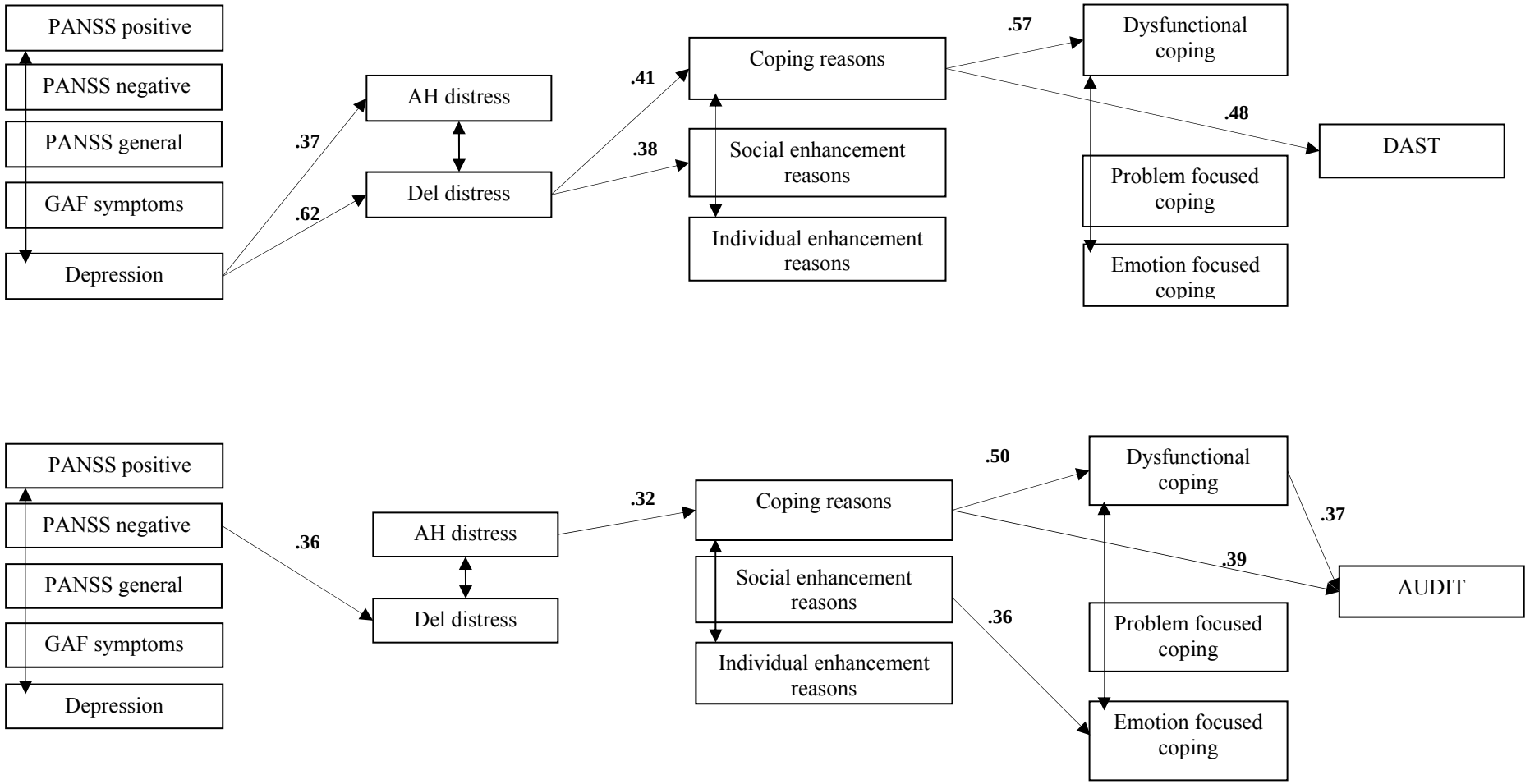


Figure 2. Alternative model on whole sample. Numerical values represent standard path coefficients. Paths with numerical values were significant ($p < .05$). Non-significant paths are not shown.



Figures 3 & 4. Alternative model on drug subsample (DAST as outcome) and alcohol subsample (AUDIT as outcome). Numerical values represent standard path coefficients. Paths with numerical values were significant ($p < .05$). Non-significant paths are not shown.

6.3.3. Alternative model

The alternative model contained the paths from the original hypothesised model with the addition of the two additional direct paths identified from our examination of the modification indices: from coping reasons for use and social enhancement reasons for use to InDUC scores. The fit of this alternative model was good (see figure 2), the χ^2 was non-significant and the SRMR, RMSEA and CFI were inside the range indicating a good fit: $\chi^2(45, N=82)=50.47$, p=.266, SRMR=.07, RMSEA=.04 (90% Confidence interval=.00-.09), CFI=.98, AIC=6012.46, BIC=6190.56. The model shows that positive symptoms, GAF symptoms and depression predict distress in relation to symptoms which in turn predict coping reasons for use. Coping reasons for use predict both dysfunctional coping and substance use consequences as measured by the InDUC. However, dysfunctional coping does not predict substance use consequences indicating that the use of dysfunctional coping strategies generally does not mediate the relationship between reasons for use and substance use. Social enhancement reasons and individual enhancement reasons are not predicted by symptoms directly or distress in relation to symptoms and do not have an impact on substance use outcome. Individual enhancement reasons are related to greater use of emotion focused coping strategies but there is no impact of these types of motives or coping strategies on substance use consequences. In brief, coping related reasons for use are related to harmful consequences from substance use whereas social and individual enhancement reasons are not.

6.3.4. Results of models in drug and alcohol subgroups

We fitted the hypothesised model separately in the subgroups defined by those subjects whose main substance of abuse was drugs and alcohol respectively. This reduced our sample size from 82 to 39 and 43 respectively. As with the whole sample, the hypothesised model did not fit the data well in either subgroup although was much improved in the alcohol subgroup ($\chi^2(45, N=43)=67.09$, p=.018 SRMR=.16, RMSEA=.11 (90% Confidence interval=.05-.16), CFI=.87, AIC=3184.12, BIC=3314.45).

Finally, we replaced the InDUC as outcome with the DAST score for the drug subsample and the AUDIT score for the alcohol subsample, this allowed us to test the sensitivity of the alternative model by comparing it to a model using substance

specific outcomes. The model did not adequately fit the observed data for the drug subsample although the standardised coefficients were broadly the same as for the full sample (Figure 3). When the InDUC was replaced by the AUDIT in the alcohol subsample however, the final model fitted the data well (χ^2(45, N=43)=56.62, p=.133, SRMR=.15, RMSEA=.07 (90% Confidence interval=.00-.13), CFI=.94, AIC=3159.61, BIC=3289.94). In this model there is a direct effect of coping reasons for use on substance use outcome but there is also a significant effect of coping reasons for use on dysfunctional coping and in turn, an effect of dysfunctional coping on substance use outcome. This is consistent with some mediation of the effect of coping reasons by dysfunctional coping (see Figure 4).

6.4. Discussion

We tested a mediational model of substance use in which distress in relation to symptoms, reasons for use and coping strategies were hypothesised to mediate the link between psychopathology and substance use. Our hypothesised model, one of complete mediation, was not supported by the data. The alternative model, which included direct effects of reasons for use on substance use outcome, revealed that coping reasons for use were related to harmful consequences from substance use whereas social and individual enhancement reasons were not. As predicted, distress and coping reasons for use mediated the relationship between symptoms and substance use but coping strategies did not, thus our study hypotheses were only partially supported: there was no mediating effect of coping despite a strong relationship between coping reasons for use and the use of dysfunctional coping strategies generally. This is in contrast to our earlier research with a non-clinical sample (see previous chapter) which found that coping reasons for use had their effect on substance use solely through the use of dysfunctional coping strategies. When we stratified the sample and tested the model in the drug and alcohol subgroups however, there was evidence of some mediation in the alcohol subsample: Coping reasons for use had both direct and indirect effects on problematic drinking.

The associations between coping reasons for use and harmful consequences from substance use support previous research with student samples (e.g. Cooper, 1994; Cooper et al, 1995) and samples with psychosis (Gregg, Barrowclough & Haddock, 2009; Spencer et al, 2002). Likewise the finding of an association between symptoms

and reasons for use replicates our earlier research with a sample of people with psychosis (Gregg et al, 2009). Our findings extend previous research by showing that some substance use is motivated by increased symptoms and may be considered an attempt to alleviate distress in relation to those symptoms. Thus our results provide some support for the self medication hypothesis proposed by Khantzian (1985; 1997). Significantly, the findings suggest that the use of substances for coping reasons is related to worse substance use outcomes. Social and individual enhancement reasons for use, which were not related to symptoms, had no effect on substance use outcome. Thus it appears that it may be those people who use substances to cope with symptoms who are at greatest risk of problematic substance use.

We found evidence that dysfunctional coping strategies mediated the relationship between coping reasons for use and substance use in the alcohol using subsample but not the drug using subsample. It is not clear whether these discrepant findings are a result of the small sample size and reduced power when the sample was stratified into sub groups or whether the observed relationship is specific to alcohol users only. If the latter, this may indicate that alcohol users who are drinking to cope require different kinds of interventions, or differently focused interventions to those who are drinking for other reasons or those who are using other substances to cope. As Mueser et al (1998) note, the dually diagnosed population is a heterogeneous group, and it is quite possible that different models may account for comorbidity in different groups of people.

Our small sample size meant that we were not able to divide our drug users into smaller groups (i.e. separate groups of cannabis, stimulant and opiate users) to see whether different types of drugs were being used for different reasons and use the model to test this. Likewise, the small sample size also precluded us from fitting the model in different demographic subgroups (e.g. males and females only). Similarly, because participants completed assessment measures about their 'main' substance only we were not able to assess whether participants who were using multiple substances (more than half of the sample) were using different substances differentially. It is possible that multiple models may apply for some individuals (Mueser et al, 1998).

Other limitations that must be acknowledged include the use of the inventory of drug use consequences (InDUC) as our main outcome measure. Amount and frequency of substance use (as measured by the timeline followback method) was not related to symptoms, distress, reasons for use or coping strategies. InDUC scores were not related to frequency of substance use (days abstinent) but were related to amount of use (units of alcohol consumed over the previous 30 days and the cost of drugs used) indicating that InDUC scores do reflect the consumption of greater quantities of substances.

The cross sectional nature of the study meant that it was not possible to determine causal relationships. Associations between psychosis and substance use are likely to be dynamic and bidirectional with substance use and the use of dysfunctional coping strategies also exerting an influence on psychopathology. It was not possible to test the complete model proposed by Barrowclough et al (2007) which hypothesises a feed forward cycle of substance use in which increased substance use or substance use consequences impact on psychosis symptoms via increased interpersonal conflict. It is possible that interpersonal conflict, particularly that found between family members, is a mediator of the relationship between substance use and psychopathology. We know that living with a 'high expressed emotion' (EE) relative is associated with an increased relapse rate in schizophrenia (Bebbington & Kuipers, 1994; Butzlaff & Hooley, 1998) and high numbers of dually diagnosed patients have a high EE relative (Barrowclough, Ward, Wearden & Gregg, 2005). Additionally, we did not control for potential confounds although we acknowledge that other unmeasured variables may explain some of the relationships in the final model. For example there may be other negative consequences associated with psychosis such as social isolation and stigma which may explain some of the observed relationship between symptoms and reasons for use. Significantly, we were not able to control for the use of other substances although more than half of our sample were using two or more substances concurrently. Future studies should use prospective methods (e.g. diary methods) to establish the temporal sequence of variables in the model. Attempts should also be made to control for the impact of poly-substance use.

Despite these limitations our findings do extend previous research by highlighting the importance of reasons for substance use in understanding the relationship

between symptoms and substance use. The finding that more distressing symptoms are related to more coping reasons for use is significant and has some important clinical implications. People with psychosis who are experiencing distressing symptoms and are using substances to cope may require help developing alternative, more adaptive coping strategies to employ when faced with symptoms that they appraise as distressing. Substance use that is motivated by individual enhancement reasons (e.g. to feel more emotions, more self aware, more confident or 'normal') appears not to be related to symptoms or distress but is related to greater use of emotion focused coping strategies and may reflect efforts to regulate negative internal states and emotions. Substance users using for these reasons may require assistance developing a wider repertoire of enhancement skills.

Chapter 7

Cannabis use in daily life: An experience sampling study

Abstract

The study examines the relationship between daily cannabis use and psychopathology in a sample of people with psychosis and healthy controls. Experience sampling methodology (ESM) was used to examine whether cannabis use in daily life varied as a function of psychopathology and also whether psychopathology predicted cannabis use in daily life (self medication). Self reported reasons for cannabis use were also examined and the extent to which coping reasons for use moderated the effect of mood and symptoms on cannabis use was investigated. Results indicated that use of cannabis in daily life was predicted by positive affect but not by negative affect, delusions or hallucinations overall. However, for those who reported using cannabis to cope with distressing emotions and symptoms negative affect did predict the use of cannabis. Cannabis use was associated with subsequent short term increases in positive affect, hallucinations and delusions but with a longer term decrease in hallucinations. The clinical implications of these findings are discussed.

7.1. Introduction

Rates of cannabis use by people with psychosis are high (Green, Young & Kavanagh, 2005) and worse outcomes have been reported for people who use cannabis compared to those who do not (e.g. Caspari, 1999; Linszen, Dingemans & Lenior, 1994). The reasons for this increased comorbidity are not yet fully understood. Experimental work investigating the effects of delta-9-tetrahydrocannabinol (Δ-9-THC, the major psychoactive component of cannabis) has shown that cannabis can cause transient psychosis in both healthy and psychosis prone individuals and can exacerbate existing psychosis (D'Souza et al, 2004; D'Souza et al, 2005; Henquet et al, 2006). A number of prospective cohort studies (e.g. Andreasson et al, 1987; Ferdinand et al, 2005; Henquet et al, 2005; van Os, Bak, Hanssen, Bijl, de Graaf, & Verdoux, 2002; Stefanis, Delespaul, Henquet, Bakoula, Stefanis, & Van Os, 2004; Zammit, Allebeck, Andreasson, Lundberg, & Lewis, 2002) have suggested that cannabis use has a causal role in the development of psychotic disorders but there is also some evidence of reverse causality: that cannabis use is secondary to psychosis for some people (Ferdinand et al, 2005; Hambrecht & Hafner, 1996).

Self report studies show that people with psychosis report using cannabis to relieve dysphoria; for social enhancement purposes and to increase positive affect (e.g. Green, Kavanagh & Young, 2004) and that they do so despite being aware that cannabis can negatively impact on positive symptoms (Dekker, Linszen & De Haan, 2009). There is evidence to suggest that cannabis is sometimes used to self medicate psychotic symptoms and medication side effects i.e. to alleviate or cope better with them (e.g. Addington & Duchak, 1997; Goswami, Mattoo, Basu & Singh, 2004) although this is reported less frequently. There is also evidence from the wider substance use literature that reasons for use, particularly coping reasons are related to the amount of substances consumed and to increased psychopathology in people with psychosis. For example Spencer, Castle & Michie (2002) found that motives related to 'relief of positive symptoms and medication side effects' predicted substance use dependence and more recently Gregg, Barrowclough & Haddock (2009) found that 'coping with distressing emotions and symptoms' reasons for use were related to positive symptoms, general symptoms, depression and suicidal behaviour as well as to quantity of substance use.

It has been suggested that these self reported reasons for use may merely be post-hoc rationalisations of behaviour (Miller, Erikson & Owley, 1994) but there is evidence to suggest that substance use is a consequence of symptoms. For example Gregg, Barrowclough, Emsley and Haddock (previous chapter) found that self reported reasons for substance use and coping strategies mediated some of the relationship between psychopathology and substance use in a sample of people with psychosis and comorbid substance use disorder. Distress in relation to symptoms mediated the relationship between psychopathology and coping reasons for use and in turn, coping reasons for use were directly related to substance use. Gregg et al interpreted these findings as providing support for a self medication model of substance use but their conclusions were limited by the cross sectional nature of their study.

A more valid test of the self medication hypothesis is to investigate the relationship between cannabis use and symptom increases. Experience sampling methodology (ESM), a structured diary technique, provides a means to assess this. ESM makes use of portable signalling devices (usually a digital wrist watch) to prompt study participants to fill out self reports to describe their present experiences when the alarm sounds and provides a representative sample of moments in a person's daily life (De Vries, 1992). A significant strength of the method is the lack of reliance on retrospective assessment. Three studies to date have investigated the relationship between cannabis use and psychopathology using ESM. Tournier, Sorbara, Gindre, Swendsen, & Verdoux (2003) investigated cannabis use and anxiety in a sample of 79 university students and found that there was no association between level of state anxiety and cannabis use in daily life. Verdoux, Gindre, Sorbara, Tournier & Swendsen (2003) found that cannabis use was associated with increased psychotic phenomena (unusual perceptions, thought influence and perceived hostility) in university students, especially in participants with increased vulnerability to psychosis. Recently Henquet, van Os, Kuepper, Delespaul, Smits, a Campo & Myin-Germeys (2010) used ESM to examine cannabis use, mood and psychotic symptoms in 42 people with a psychotic disorder and 38 healthy controls. Henquet et al (2010) found that cannabis use was associated with subsequent increases in positive affect and, in the psychotic group only, decreases in negative affect. In the psychotic group but not the controls, cannabis use was associated with increased levels of hallucinatory experiences and significantly, these increases in hallucinatory

experiences outlasted the short term mood enhancing effects of cannabis use. None of the three studies found evidence of self medication (cannabis use was not predicted by either mood or intensity of psychosis).

The current study was designed to further investigate the association between psychosis and cannabis use in daily life. The aims were to examine whether cannabis use in daily life fluctuates as a function of mood and psychopathology; whether cannabis use is associated with subsequent changes in mood and psychopathology and whether self reported reasons for cannabis use (specifically coping reasons for use) moderate the impact of psychopathology on cannabis use. We also investigated whether people with psychosis differed from healthy controls in their use of cannabis in terms of both antecedents and effects.

7.2. Method

7.2.1. Participants

A total of 50 people were recruited to the study: 18 people with psychosis and 32 students without a psychiatric history. The psychosis sample was recruited from four mental health trusts in Greater Manchester, UK. Ethical approval was granted by the local NHS research ethics committee and by the University of Manchester research ethics committee. Participants were included if they met DSM IV diagnostic criteria (First, Spitzer, Gibbon & Williams, 2002) for schizophrenia or another psychotic disorder and either cannabis abuse or dependence. They were also required to be using cannabis at least three times weekly. The student sample was recruited via an advert placed on the student intranet at the University of Manchester, UK (see appendix 13). Respondents were included if they met the same criteria for cannabis use (DSM IV diagnosis of abuse or dependence and cannabis use at least three times per week) and were asked to confirm that they had no psychiatric history and were not currently taking psychiatric medication. The exclusion criterion for both groups was the same: DSM IV diagnosis of dependence on other substances (including alcohol).

Of the 50 people initially recruited to the study 8 completed fewer than 20 valid reports or did not report enough cannabis use during the 6 day study period (4 from

each group). The final sample therefore consisted of 42 participants: 14 participants with psychosis and 28 student controls.

7.2.2. Procedure

Participants were given a digital wristwatch and diary booklets at a briefing session with the lead researcher. The methodology was explained and participants were given the opportunity to practice completing the booklet and to ask questions before the ESM assessment period began. The wristwatch emitted a beep at semi-random times ten times daily for six days between the hours of 9:00am and 12 midnight. The diaries contained questions about thoughts, affect, psychopathology and cannabis use as well as contextual information about current activity for example the whereabouts of the participant and whether he or she was alone or with others. Participants were required to complete diary entries within fifteen minutes of hearing the beep and were asked to record the time that the entry was completed. Only entries completed within this window were included in the analyses. Participants were contacted via text message or telephone during the week to check that the diaries were still being completed and to give participants the opportunity to ask questions or share concerns. Participants who completed less than 20 valid reports were excluded as were those who used cannabis on less than three separate occasions during the ESM week.

7.2.3. Measures

All participants completed the Reasons for Substance use in Schizophrenia questionnaire (ReSUS, Gregg, Barrowclough & Haddock, 2009) during the briefing session. The ReSUS was used to assess reasons for cannabis use. The questionnaire consists of 40 items describing situations in which people use drugs. Participants were asked to indicate whether they used cannabis in that situation "never", "sometimes", "often" or "almost always". The ReSUS has three subscales 'coping with distressing emotions and symptoms', 'social enhancement and intoxication' and 'individual enhancement' each of which has good internal reliability (Cronbach's alphas of .91, .81 and .82 respectively, Gregg et al, 2009).

Participants were also asked about their current level of cannabis use at this session. Participants were asked on how many days per week did they typically use cannabis

and the value of the cannabis they used in a typical week (recognising that not all cannabis consumed would have been paid for by themselves).

The Positive and Negative Syndrome Scale (PANSS; Kay, Fiszbein & Opler, 1987) was used to assess symptom severity in the psychosis sample. The PANSS is a 30 item structured clinical interview which is used to assess severity of positive symptoms, negative symptoms and general psychopathology in schizophrenia. Items are rated on 7-point Likert scales (0 = absent, 7 = severe) which can be summed to provide a total severity score. The interview was administered at the end of the week, after the ESM diaries had been completed.

Measures of mood, psychopathology and cannabis use were derived from the ESM diaries (see appendix 12). Items were drawn from the sample of items used by ESM researchers at Maastricht University in the Netherlands (see Delespaul, 1995) and were chosen because they had been previously shown to have good reliability in samples with psychosis (e.g. Myin-Germeys, Nicolson & Delespaul, 2001; Myin-Germeys, Krabbendam, Delespaul, & Van Os, 2003)

Mood

Current mood was assessed with twelve items rated on a 7 point Likert scale (1 = not, 7 = very) which referred to mood at the time of the beep. Principle Components Analysis revealed two distinct mood scales, the means of which were used to form subscales for use in subsequent analyses: 1) a positive affect subscale 'at this moment I feel…satisfied; happy; cheerful; relaxed; good' (Cronbach's alpha in the current study was .84) and 2) a negative affect subscale 'at this moment I feel…guilty, sad, lonely, anxious, uncertain, irritated, bored) (Cronbach's alpha = .86). Positive $affect_{previous}$ and negative $affect_{previous}$ referred to positive affect and negative affect at the previous beep.

Psychopathology

Current psychopathology was assessed with six items rated on a 7 point Likert scale (1 = not, 7 = very). Principle Components Analysis revealed two psychopathology subscales: a delusions subscale: 'my thoughts are… racing; suspicious; hard to express; influenced by others' and an hallucinations subscale: 'I hear voices' and 'I

see things', (Cronbach's alpha delusions = .92; hallucinations = .87). $Delusions_{previous}$ and $hallucinations_{previous}$ referred to delusions and hallucinations at the previous beep.

Cannabis use

Participants were asked to indicate whether they had used cannabis in the period between the current beep and the preceding beep. Cannabis $use_{previous}$ referred to cannabis use in the period between the previous beep and the beep before that.

7.2.4. Data analysis

ESM data have a hierarchical structure with repeated observations (level one) nested within days (level two) nested within participants (level three) therefore multilevel random regression analyses were conducted. Analyses were conducted with STATA (version 10). The XTMELOGIT routine was used for regression analyses with dichotomous dependant variables and the XTMIXED routine was used for analyses with continuous dependant variables. Odds ratios (dichotomous variables) and betas (continuous variables) represent the relationships between independent and dependent variables and can be interpreted identically to odds ratios and betas in univariate linear regression analyses.

To investigate whether affect and psychopathology impacted on cannabis use multilevel analyses were conducted entering positive $affect_{previous}$; negative $affect_{previous}$; $delusions_{previous}$, and $hallucinations_{previous}$ as independent variables in consecutive models with cannabis use as the dependent variable. Cannabis use at the previous beep was controlled for in each of these analyses along with age. Group (0 = controls, 1 = psychosis) and an interaction term were included in each of the models in order to determine whether the psychosis group differed from the student controls.

The effect of cannabis use on affect and psychopathology was investigated with cannabis use entered as the independent variable and positive affect; negative affect; delusions and hallucinations as dependent variables in consecutive models. Affect and psychopathology at the previous beep were controlled for in these analyses along with age and again, group and an interaction term were included in order to examine group differences.

To investigate whether coping reasons for use moderated the impact of affect and psychopathology on cannabis use the 'coping with distressing and emotions' subscale of the ReSUS was dichotomised by median split (1 = at or above median, *n* = 16; 0 = below median, *n* = 26) and was entered as both a main effect and an interaction with positive $affect_{previous}$; negative $affect_{previous}$; $delusions_{previous}$ and $hallucinations_{previous}$ in consecutive models. Cannabis use at the previous beep and age were controlled for in each of these analyses.

7.3. Results

7.3.1. Participant characteristics

The psychosis sample consisted of 12 males and 2 females (mean age 32.5, SD 8.5). Eleven had a diagnosis of schizophrenia and one of schizoaffective disorder. All were stable outpatients as PANSS scores confirmed (mean positive symptoms = 13.4, SD = 3.0; mean negative symptoms = 11.8, SD = 4.3; mean general symptoms = 25.8, SD = 4.8).

The student sample consisted of 21 males and 7 females (mean age 22.4, SD 3.4). There were no significant differences between the two groups in terms of gender or racial origin (see Table 1) although the student sample were significantly younger than the psychosis sample ($t(40) = 5.5$, $p<.001$) and age was therefore controlled for in subsequent analyses. The student sample were also less likely to be living alone (3.7% of the student sample vs. 35.7% of the psychosis sample X^2 (1) = 7.8, p = .005). The majority of people in both groups met criteria for cannabis use dependence (85.7% of those with psychosis, 78.6% of students).

Multilevel regression analyses revealed that there were no differences between the groups in terms of either positive affect (β = 0.36, p = .095, 95% CI = -0.79 - 0.06) or negative affect (β = 0.28, p = .294, 95% CI = -0.24 = 0.80). The psychosis group reported significantly more hallucinations than the control group (β = 1.07, p = .004, 95% CI = 0.35- 1.79) but they did not differ in the amount of delusional intensity experienced (β = 0.10, p = .769, 95% CI = -.54 – 0.73). Means and standard deviations for these measures can be found in table 1.

The two groups did not differ in terms of frequency of cannabis use. Both reported using cannabis for around 6 days a week on average. However, the psychosis group

reported spending twice as much per week on cannabis as the student group (GBP 48.75 (77 USD) and GBP 24.46 (39 USD) respectively, z = 2.7, p = .008) indicating that they were consuming greater quantities of cannabis. The ESM diaries did not reveal any differences in frequency of use: the psychosis group reported slightly more 'cannabis moments' in their ESM diaries than the student group (15.9 and 12.4 respectively) but this was not a significant difference (t(40) = 1.4, p = .166). For the psychosis group 53.8% of all moments were cannabis moments compared to 35.8% for the student group.

The groups differed on two of the ReSUS subscales (Table 1): The psychosis group was more likely to report coping reasons for use and individual enhancement reasons for use than the control group.

7.3.2. The effect of psychopathology on cannabis use

Positive affect prior to the beep predicted cannabis use (OR = 1.55, p <.001, 95% CI = 1.26 – 1.90). The group x positive $affect_{previous}$ interaction was also significant (OR = 0.64, p = .010, 95% CI = 0.46 – 0.90) indicating that the student controls were more likely to use cannabis when experiencing positive mood than the psychosis group. Negative affect prior to the beep did not predict cannabis use (OR = 0.91, p = .399, 95% CI = 0.72 – 1.14) and nor did hallucinations (OR = 1.08, p = .609, 95% CI = 0.80 – 1.46) or delusions (OR = 1.17, p = .173, 95% CI = 0.94 – 1.45).

However, when the dichotomised ReSUS 'coping with distressing emotions and symptoms' subscale was entered into the above models there was a non-significant trend for negative affect (OR = 0.76, p = .059, 95% CI = 0.57 – 1.01). The significant interaction between ReSUS 'coping' reasons and negative affect (OR = 1.48, p = .038, 95% CI = 1.02 – 2.14) indicated that for individuals who scored highly on this subscale, increased negative affect did predict cannabis use. Likewise there was a significant ReSUS coping x positive affect interaction (OR = 0.55, p < .001, 95% CI = 0.40 – 0.77). Individuals who scored highly on the coping subscale were more likely to use cannabis when positive affect decreased. There were no significant interactions between ReSUS coping and either delusions or hallucinations.

Table 1. Psychosis and control group comparisons

	Psychosis group (*n* = 14)	**Control group** (*n* = 28)	**Statistic**	**Significance**
Age				
Mean (SD)	32.4 (8.5)	22.4 (3.4)	t = 5.5	p < .001
Gender				
Male	12	21	X^2 = 0.6	p = .425
Female	2	7		
Ethnicity				
White	12	26	X^2 = 0.6	p = .457
Non-white	2	2		
Relationship status				
Single	10	27	X^2 = 5.6	p = .018
Married/cohabiting	4	1		
Living Status				
Alone	5	1		
With family	7	2	X^2 = 22.9	p < .001
Shared accommodation	2	25		
Cannabis use frequency				
(days per week used)	5.6 (1.5)	6.3 (1.1)	t = 1.6	p = .125
Cannabis use cost				
(GBP per week)	48.75	24.46	z = 2.7	p = .008
DSM IV diagnosis				
Cannabis abuse	2	6	X^2 = 0.3	p = .578
Cannabis dependence	12	22		
Reasons for use (ReSUS)				
Coping				
Social enhancement	2.4	1.8	t = 2.9	p = .010
Individual enhancement	2.6	2.6	t = 0.5	p = .644
	2.0	1.6	t = 2.2	p = .038
ESM diary items				
(Mean, SD)				
Positive affect	3.2 (1.1)	3.6 (0.9)	β = 0.4	p = .095
Negative affect	2.1 (1.1)	1.7 (0.9)	β = 0.3	p = .294
Hallucinations	2.4 (1.7)	1.2 (0.9)	β = 1.1	p = .004
Delusional intensity	2.3 (1.4)	2.1 (1.1)	β = 0.1	p = .769

7.3.3. The effect of cannabis use on psychopathology

Cannabis use in the period prior to the beep was associated with an increase in positive affect after the beep (β = 0.18, p = .004, 95% CI = 0.06 – 0.29). There was no effect of group on positive affect and the cannabis use x group interaction was not significant indicating that cannabis use increased positive affect for individuals with psychosis and healthy controls equally. Cannabis use in the period prior to the beep was not associated with a change in negative affect after the beep (β = 0.03, p = .596, 95% CI = -0.07 – 0.12). Cannabis use prior to the beep was associated with an increase in delusional intensity (β = 0.15, p = .012, 95% CI = 0.03 – 0.27).The cannabis use x group interaction was not significant. Cannabis use prior to the beep was also associated with an increase in hallucinations (β = 0.09, p = .035, 95% CI = 0.01 – 0.18) but again the cannabis use x group interaction was not significant indicating that the psychosis group did not differ from the control group in their sensitivity to the psychosis-inducing effects of cannabis.

Temporal analyses of cannabis effects

Following Henquet et al (2010) we assessed the duration of the observed cannabis effects on positive affect, delusions and hallucinations by entering both cannabis use and cannabis $use_{previous}$ simultaneously in the same model. These analyses revealed that the observed increases in positive affect were only apparent in the short term (β = 0.12, p = .016, 95% CI = 0.02 – 0.22 for cannabis use and β = 0.01, p = .707, 95% CI = -0.08 – 0.05 for cannabis $use_{previous}$). Likewise for delusions, increases were observed only in the short term (β = 0.11, p = .036, 95% CI = 0.01 – 0.21 for cannabis use and β = 0.01, p = .804, 95% CI = -0.06 – 0.08 for cannabis $use_{previous}$). However, for hallucinations, the observed increase was short-lived (β = 0.10, p = .020, 95% CI = 0.02 – 0.19) and was followed by a *decrease* in hallucinations in the longer term (β = -0.09, p = .003, 95% CI = -0.15 – 0.03 for cannabis $use_{previous}$).

7.4. Discussion

The study findings indicated that cannabis use in daily life was not a consequence of either delusions or hallucinations, suggesting that self medication of positive psychotic symptoms was not a causal factor for drug use. Positive affect was a predictor of cannabis use: use was more likely to occur when participants felt good. This was particularly so for the student controls. However, in the subsample of

people who had self reported using cannabis for coping reasons (mostly participants with psychosis) cannabis use was more likely when positive affect was reduced. Negative affect did not predict cannabis use overall. However, in people who reported using cannabis to cope with distressing emotions and symptoms, negative affect *did* predict cannabis use. These findings stand in contrast to Henquet et al's (2010) who found no association between mood and subsequent cannabis use for either participants with psychosis or healthy controls. The finding that coping reasons for use moderated the impact of affect on cannabis use is an important one and confirms our previous finding (Gregg, Barrowclough & Haddock, 2009) that there appears to be a sub group of people who are motivated to use cannabis to alleviate dysphoria and distress.

Cannabis use was associated with subsequent increases in positive affect, delusional intensity and hallucinations but not with negative affect. Interestingly, and in contrast to Henquet et al (2010) we did not find that the psychosis group were more sensitive to the psychosis-inducing effects of cannabis. It is possible that our student controls, who were all heavy cannabis users, were higher in schizotypal traits than non-cannabis using student populations and were therefore more sensitive to the psychosis-like effects of cannabis use (Barkus, Stirling, Hopkins & Lewis, 2006) or as Freeman et al (2005) suggest, people who self-select for studies of this type may be more prone to psychological disturbance. Henquet et al (2010) also found that the psychosis group did not differ in overall levels of delusional ideation from the control group, a finding they attributed to the long-term psychosis effects of cannabis use. Support for this hypothesis comes from Thewissen, Bentall, Lecomte, van Os and Myin-Germeys (2008) who reported that delusion levels were higher in controls using cannabis than in controls not using cannabis. However, it is also possible that the items used to assess delusional intensity (thoughts racing; hard to express; influenced by others and suspiciousness), which were also used by both Henquet et al (2010) and Thewissen et al (2008), may lack specificity and could also be applicable to other mental health problems or mood states commonly found in student populations (such as anxiety and depression). The relationship of ESM delusion scores to PANSS symptom scores seem to indicate that this may be the case. Delusion scores were more strongly related to PANSS general symptom scores ($r = .60$, $p < .001$) than to PANSS positive symptom scores ($r = .41$, $p < .001$) in the

psychosis group. We must therefore be cautious in interpreting the results from these items.

The subjective effects of increased positive affect reported in the self report literature (Dekker et al, 2009) were confirmed in this study. Overall, participants used cannabis when they felt good, and cannabis use helped them feel even better. However, at the same time, psychotic phenomena were increased. It is not clear whether cannabis users are not subjectively aware of the negative effects of use; whether they downplay them or whether there is a conscious decision that the perceived benefits of cannabis use outweigh the negative consequences, or the perceived negative consequences of *not* using cannabis. Future research should attempt to elucidate this further.

Analysis of the temporal effects of cannabis use revealed that cannabis use had only a short term impact on positive affect and on delusional intensity. The effect on hallucinatory experiences was contradictory: cannabis use appeared to increase hallucinations in the short term, but decrease them in the longer term. It is possible that the observed decrease is a 'return to normal' subsequent to an acute increase in hallucinatory intensity rather than a delayed beneficial effect of cannabis on hallucinations.

Results support our earlier research (Gregg et al, 2009; Gregg, Barrowclough, Emsley and Haddock, previous chapter) showing that people use substances for multiple reasons and that there appears to be a sub group of people who are using substances (in this case cannabis) to alleviate negative affect. Coping reasons for use appear to be key determinants of substance use behaviour and should be included in future research investigating links between cannabis use and psychosis.

We did not include a measure of distress in relation to symptoms in the ESM diaries. Our previous research (previous chapter) has shown that it is distress in relation to symptoms rather than symptoms per se that motivates substance use and it is possible that our finding that positive symptoms (hallucinations and delusions) do not predict cannabis use may be attributable to this omission. Future ESM studies should include a measure of distress in order to examine this relationship further.

Limitations

Several limitations must be taken into account. First, the sample size was small, particularly the psychosis group, and it is possible that our sample of people with psychosis and comorbid cannabis use were not representative of cannabis users with psychosis generally. The small sample size also meant that power may have been limited to detect significant two-way interactions (e.g. psychosis group versus controls). Second, levels of cannabis use were not validated by other measures and we could not account for the potency of the cannabis that was being consumed by participants. A recent review suggested that the most potent forms of cannabis cause the most adverse psychological experiences (Hall & Degenhardt, 2009) and there is evidence that the different cannabinoids (tetrahydrocannabinol and cannabidiol) have different effects on positive schizophrenia-like symptoms (Morgan & Curran, 2008). Because we recorded only whether cannabis was used between beeps, not how much was being consumed we could not control for the amount and quality of cannabis being consumed. Nor did we take into account route of consumption (whether cannabis was being smoked or ingested). Future research should seek to establish how many grams of cannabis are being consumed in each joint, how many joints are being consumed between beeps and ideally, the levels of tetrahydrocannabinol and cannabidiol present. Third, we could not verify that there was no psychiatric history (or family history of psychiatric illness) in the student group.

Notwithstanding the limitations outlined above our findings have a number of important clinical implications: The consequence of increased positive affect should be recognised in discussions about cannabis use in clinical settings. Despite its deleterious effects on psychopathology, cannabis use also helps people to feel good, at least in the short term. Clinicians should investigate whether cannabis users are aware of the concurrent negative consequences of use. We did not provide individual feedback to participants about individual antecedents and consequences of cannabis use but several participants spontaneously reported an increased awareness of the interplay between cannabis use, mood and symptoms during the debriefing session at the end of the ESM week. Thus ESM could potentially be a useful tool for exploring the effects of cannabis use with clients as part of a therapeutic intervention.

The finding that coping reasons for cannabis use moderate the effect of negative affect supports the idea that an understanding of substance use behaviour and its consequences must take reasons for use into account. It also suggests that substance use is only likely to be a response to negative affect for a given set of individuals or circumstances.

For people who report using cannabis to cope (and for whom cannabis use is a result of increased negative affect) cognitive behavioural therapy relapse prevention may help clients to identify the triggers that lead to substance use and to develop alternative coping skills for use in negative affect situations.

Chapter 8

General Discussion

8.1. Summary of aims

This programme of research aimed to better understand why people with a diagnosis of psychosis use drugs and alcohol. It aimed to explore self reported reasons for use and examine the extent to which substance use could be considered an attempt to self medicate psychiatric symptoms or the secondary consequences of those symptoms (distress). The primary aim was to test a multiple risk factor model of substance use maintenance which hypothesised that reasons for use and coping strategies were the intermediary factors between psychopathology and substance use.

8.2. Literature Review

A literature review was undertaken prior to commencing the empirical studies. The review detailed the main theories proposed to explain increased rates of substance use by people with psychosis and presented the evidence for each. It concluded that simple broad models of either substance use causing psychosis or psychosis causing substance use do not adequately explain all comorbidity and suggested that more work to develop and test multiple risk factor models was required.

The review contained a comprehensive review of the self reported reasons for substance use literature and discovered considerable variability between the studies, largely due to differences in sampling and methodology. A number of different methods had been used to collect the self report data including free response, open ended questions and predetermined lists and questionnaires. Significantly, none of the studies included in the review employed self report methods with known validity and reliability for people with psychosis. Thus the review highlighted the need for a new questionnaire measure assessing reasons for substance use to be developed and validated.

8.3. Development and validation of the ReSUS questionnaire

The items that were included in the ReSUS questionnaire were derived from the existing self report research literature; from semi-structured interviews with people

with non-affective psychosis (n = 10) and from tape recorded therapy sessions of individuals with psychosis and comorbid substance use disorders and thus sampled a wide range of sources (chapters 3 and 4).

The identified reasons for use were used in a study employing Q methodology (study 1, chapter 3). In this study forty-five individuals with psychosis and comorbid substance use disorders were asked to sort the reasons for use, identifying the reasons for use that applied to them most and least. The study allowed us to identify those reasons that had the most and least salience for participants and select the reasons for use to be included in the new questionnaire. The ReSUS questionnaire has advantages over existing questionnaire measures: it includes items relating to psychotic symptoms and has both a drug and an alcohol version and can therefore be used with users of any substance.

The psychometric properties of the ReSUS questionnaire were examined in a large sample of people with psychosis (study 3, chapter 4) and in a similarly sized non-clinical sample of students (study 4, chapter 5). The clinical study revealed the ReSUS to have three factors, broadly similar to those identified in the Q study: 'coping with distressing emotions and symptoms'; 'social enhancement and intoxication' and 'individual enhancement'. The three subscales demonstrated good internal consistency and one-month test-retest reliability and the questionnaire was found to be acceptable to participants with the majority able to complete the questions without assistance. Face and content validity of the questionnaire was evidenced by significant associations with psychopathology, frequency and amount of substance use and negative consequences from use. Thus the ReSUS can potentially be usefully employed as both a research instrument and a therapeutic tool in order to help individuals with psychosis describe their drug and alcohol use.

The factor structure of the ReSUS questionnaire was not replicated in the student sample where it was found to have only two factors. The first factor 'coping' was broadly the same as the coping factor identified in the clinical sample whilst the second factor 'enhancement' contained the majority of items that had contributed to the two enhancement factors (social and individual). The 'individual enhancement' factor in the clinical study had been largely endorsed by drug users, particularly those using stimulants and opiates. There were comparatively few users of these

substances in the student sample which potentially explains this discrepancy. Although not consistent with the factor structure reported for people with psychosis this two factor solution is broadly in line with the motives identified in the non-clinical literature, particularly the alcohol literature, which tends to categorise drinking reasons into two types: negative reinforcement (coping) and positive reinforcement (enhancement). The two subscales demonstrated excellent internal consistency and one-month test-retest reliability indicating that the ReSUS could be employed in future research with student samples although further work may be needed to assess the factor structure with more diverse samples.

The most frequently endorsed reasons for use in the clinical sample were 'when I want to chill out or relax', 'when I am feeling stressed', 'when I am bored and want something to do to pass the time' indicating that substance use was likely to occur in negative affect situations. As established in many previous studies, substance users in our non-clinical samples reported predominantly social reasons for use with 'when I am with friends and we want to have a good time', 'when I want to feel good' and 'when I want to chill out and relax' being endorsed most frequently. As expected, a higher percentage of people in the clinical sample endorsed reasons for use relating to psychosis than in the non-clinical sample and clinical participants endorsed more reasons for use overall than those in the non-clinical sample. All ReSUS items were endorsed at least three times in each sample indicating the relevance of items for both clinical and non-clinical samples.

8.4. The relationship of reasons for use to psychopathology, coping strategies and substance use

Previous research with both clinical and non-clinical samples suggested that reasons for use were associated with a range of psychiatric symptoms and to both amount and frequency of substance use. On the basis of these studies, and the model of substance use maintenance proposed by Barrowclough et al (2007), it was hypothesised that higher ReSUS scores would be associated with more symptoms and to both quantity and frequency of substance use and to problems associated with substance use. These hypotheses were initially tested in the clinical sample used to validate the measure (study 3, chapter 4) and were partially supported. There was no association between ReSUS subscales and frequency of substance use overall.

However, there was a significant association between coping reasons for use and increased expenditure on substances other than alcohol (indicating greater use) and greater negative consequences from use. Additionally, individuals who met criteria for drug or alcohol dependence (rather than abuse) scored more highly on the coping subscale. Coping reasons for use were also associated with several measures of psychopathology, unlike individual enhancement reasons which were related only to positive symptoms, and social enhancement, which had no such associations.

The same hypotheses were investigated in the non-clinical sample (study 3, chapter 5) and in addition the relationship of reasons for use and amount of frequency of substance use to general coping strategies was examined. A mediational model of substance use was proposed and tested. In this study both categories of reasons for use (coping and enhancement) were related to all measures of psychopathology. Coping reasons for use were related to amount of alcohol consumption, frequency of both drug and alcohol use and negative consequences from use. Enhancement reasons were related to the amount of alcohol consumed and to hazardous drinking but not to drinking frequency, potentially reflecting binge drinking behaviour. These results support the finding that drinking to cope with negative emotional states is associated with alcohol problems in the general population.

As expected, coping reasons for use were related to increased use of dysfunctional coping strategies but in contrast to our predictions, they were not related to decreased use of more adaptive strategies (problem and emotion-focused coping). Structural equation modelling confirmed that psychopathology was related to substance use and revealed that the relationship was partially mediated by coping reasons for use and the use of dysfunctional coping. This was in contrast to our hypothesis of complete mediation. The two types of reasons for use impacted on substance use via different paths: coping reasons for use were mediated by dysfunctional coping whereas enhancement reasons had a direct effect.

We were able to broadly replicate the results from our student sample to show significant associations between psychopathology, reasons for use and negative consequences from substance use in a sample of people with psychosis (study 4, chapter 6). In this study distress in relation to symptoms was included in the model as a mediating factor between psychopathology and reasons for use. As predicted,

distress and coping reasons mediated some of the relationship between symptoms and substance use consequences. Coping reasons for use were related to harmful consequences of use but the use of substances for social and individual enhancement purposes was not. Again, there was no effect of problem and emotion-focused coping in the model. In contrast to our findings in the non-clinical sample, there was no mediating effect of dysfunctional coping strategies although there was evidence of partial mediation in the alcohol using subsample.

Whilst the subgroup findings derived from exploratory analyses should be interpreted with caution, the results may suggest that alcohol users represent a distinct group for whom dysfunctional coping strategies play a more significant role in predicting harmful consequences from use. The finding of a mediating effect of dysfunctional coping in our non-clinical sample, which was largely made up of alcohol users (75.1%) may lend weight to this hypothesis. Barrowclough et al (in press) found that response to integrated motivational interviewing and cognitive behavioural therapy treatment appeared to be different for those who reported only alcohol abuse or dependence. There were significant effects in favour of the psychological therapy in terms of an increase in days abstinent from substance use that endured over the two year follow up. Thus it seems reasonable to suggest that people with psychosis may require different treatments according to the type of substances they use. Future research should examine this further.

In summary, the results of the two studies testing the hypothesised model suggest that some (but not all) substance use can be considered an attempt to self medicate symptoms and negative affective states and that furthermore, these attempts to cope may be associated with worse substance use outcomes (that is, increased negative consequences from use). Thus there may be a sub group of substance users with psychosis for whom substance use is more likely to be problematic.

The hypothesised models in both studies included adaptive coping strategies and more 'positive' reasons for use in order to investigate whether they served any protective function but there was no evidence of an association between reduced adaptive coping and increased substance use. Enhancement reasons for use were related to increased problematic substance use in the non-clinical sample but had no impact on adverse consequences of substance use in the clinical sample. Thus the

alternative models developed in these studies provided support for Barrowclough et al's (2007) multiple risk factor model of substance use maintenance which highlights the role of distress in relation to symptoms and dysfunctional coping strategies. It was not possible to test Barrowclough et al's complete model which also hypothesises a feed forward cycle of substance use in which increased substance use impacts on psychosis symptoms via internal and external stressors such as increased interpersonal conflict, because of the cross-sectional design. Only prospective longitudinal studies would be able to test this further. Other limitations in the studies reported here include the small sample size in the clinical sample and the under-representation of drug users in the non-clinical sample, particularly users of drugs other than cannabis. Although we stratified both samples into groups of alcohol and drug users and examined the model in each, the subgroup analyses in the clinical sample and in the drug using student subsample were underpowered and can only be considered as exploratory, limiting the conclusions that can be drawn. We were not able to divide the drug users into smaller groups and examine the model in subsamples of other substances. Additionally, we asked participants about their 'main' substance only and therefore could not examine whether different substances were being used for different reasons.

The aim of this programme of research was not to provide an exhaustive model of why individuals with psychosis use substances but it must be acknowledged that a number of other factors could potentially impact on the model presented and tested here. For example there is evidence that stable personality traits such as neuroticism; impulsivity and trait negative affectivity are related to greater use of maladaptive coping strategies and the use of substances to cope (Blanchard et al 1999; 2000; Dervaux et al, 2001). Other factors thought to influence maladaptive coping and psychosis that may be important in the use of substances include self esteem (Taylor and Stanton, 2007) and the experience of traumatic events during childhood (Garety, Kuipers, Fowler, Freeman & Bebbington, 2001; Scheller-Gilkey et al (2004). Impairments in cognitive functioning have been hypothesised to have an impact (Tracy et al, 1995), as have lower educational attainment, lower socioeconomic status and poor interpersonal and problem solving skills.

8.5. Cannabis use in daily life

The final study in the thesis (study 5, chapter 7) investigated the relationship between changes in symptoms and cannabis use in daily life using a prospective diary method (experience sampling methodology, ESM) and in so doing aimed to address some of the methodological limitations of the earlier studies. This study also examined the impact of coping reasons for use on the relationship between symptoms and cannabis use and as such represents a significant improvement on research in the field. It is only the second ESM study to investigate cannabis use in relation to symptoms and is the first to consider reasons for use as a potential moderating factor. Findings suggest that positive and negative affect but not positive symptoms predict cannabis use in daily life. Positive affect was a predictor of cannabis use overall, with cannabis more likely when positive affect is high. However, for those who reported using cannabis to cope, cannabis use was most likely when positive affect was reduced. Likewise, increased negative affect predicted cannabis use for those who used cannabis to cope.

Cannabis use was associated with subsequent increases in positive affect, delusional intensity and hallucinations confirming the subjective effects of increased positive affect reported elsewhere in the literature. Interestingly the psychosis group was no more susceptible to the psychosis-like effects of cannabis than the student controls. However, the sample size was small and power may have been too limited to detect significant two-way interactions.

The results of the ESM study appear to suggest that it is negative affect rather than positive symptoms that predicts cannabis use in people with psychosis (in contrast to the earlier cross-sectional studies in the thesis which found associations between psychotic symptoms and substance use) and that the impact of negative affect is only apparent for those individuals who report using substances to cope. This finding, if replicated with a larger sample would provide some support for the 'weaker' variant of Khantzian's (1985; 1997) self medication model: the 'alleviation of dysphoria' model of substance use which suggests that that people with psychosis are prone to dysphoric experiences that make them prone to use substances (Mueser et al, 1998). Above all it demonstrates the importance of taking reasons for use into account when investigating relationships between psychopathology, affect and substance use and

shows that substance use is only likely to be a response to negative affect for a given set of individuals or circumstances.

8.6. Summary of methodological limitations

Methodological limitations have been discussed in each chapter and some have been outlined in the sections above. This section summarises the key methodological limitations that apply to all studies in the thesis and which should be taken into account in the interpretation of the results.

The research was primarily conducted using a cross-sectional design precluding inferences about the direction of causal relationships. Associations between psychosis and substance use are likely to be dynamic and bidirectional with substance use and coping strategies exerting an influence on psychopathology. Likewise, it is conceivable that the relationship between the use of substances to cope and deficits in coping is bidirectional. However, data from cross sectional studies such as these still provide an important contribution to the ongoing debate and the findings from the prospective ESM study do appear to suggest that the hypothesised directions are plausible.

The non-clinical sample was a self selecting student sample recruited via email who completed questionnaire measures online. The use of students as analogues for clinical populations has been criticised on the grounds of reduced generalisability. Although it is not ideal, it is common to use analogue samples when it would be difficult to recruitment adequate numbers of patients to a study. Student samples are generally used because they are relatively easy to recruit and large sample sizes are possible. It was decided that students would be an appropriate group for the current study as rates of substance use by students are high. In a survey of ten British Universities involving 3075 undergraduate students Webb et al (1996) reported that 15% were drinking alcohol at a hazardous level (i.e. >36 units weekly for females, >51 units weekly for males) and 20% were using cannabis at least weekly. A third of their sample (33%) reported using other illicit drugs (including LSD, amphetamines and ecstasy). Using a student sample allowed us to test our hypothesised model in a much larger sample than we could otherwise have achieved and the anonymity afforded may have produced more diverse results than other commonly used methods to collect information about substance use (Reips, 2002).

The students in the non-clinical sample were excluded if they did not meet the recommended clinical cut offs for substance use on either the DAST or AUDIT so as to enable comparisons with the clinical group. This may reduce generalisability to student samples generally but is otherwise considered a strength of the research. Not all participants in the existing clinical literature actually meet criteria for a current substance use disorder; some are substance 'users' and others merely past users of substances. Students in the ESM study and the clinical participants in all studies met criteria for substance use abuse or dependence (DSM IV criteria) and were using substances frequently increasing the relevance of the findings to substance users with psychosis in treatment.

Participants in studies 2 and 4 (chapters 4 and 6) were taking part in a randomised controlled trial and may not be representative of service users with substance use and psychosis presenting to mental health services generally although efforts were made to reach 'hard to engage' service users through community assertive outreach teams.

There were significant difficulties recruiting people with psychosis to take part in the ESM study. Some mental health key workers in the community mental health teams that were approached were reluctant to refer service users to the study believing that the methodology would be "too much" for their clients. Additionally, some cannabis users approached to take part were polydrug users who met dependence for other substances and were therefore not eligible to take part. Thus our psychosis sample may not be representative of cannabis users with psychosis generally, particularly those who are more impaired. In addition, four of the eighteen people with psychosis recruited to the study were not included in the analyses because they did not complete enough valid reports (20 out of a possible 60) or because they did not report enough cannabis use during the study period (<3). The PANSS interview was administered at the end of the ESM week and was not completed for people whose data did not contribute to the analysis (at the request of the local research ethics committee) meaning that we could not examine whether those who were excluded were different symptomatically from those who were included.

8.7. Summary of research implications

Recommendations for future research have been included in the individual chapters. Priorities for future work are summarised in the following subsection.

There are a number of ways that future studies could further explore and improve upon our findings. Although validated in this thesis, the ReSUS questionnaire is a new instrument and should be tested with more substance users, particularly users of substances other than cannabis and alcohol who were under-represented in the studies reported here. Associations between the ReSUS questionnaire subscales, psychopathology, coping strategies and substance use variables should be replicated in larger and more diverse samples in order to determine whether the findings reported here generalise. It may also be beneficial to test the questionnaire in a younger sample at an earlier stage of psychotic illness when problematic patterns of substance use have not yet been fully established. A longitudinal study would be needed to examine developmental pathways further.

Research testing the existing model in larger clinical samples should aim to include more users of substances other than alcohol and cannabis. Research with polydrug users should assess reasons for use for all substances used in order to establish whether different substances are used for different reasons (as the self medication hypothesis would suggest). The model could also be used to examine demographic differences (for example males versus females) and could take more risk factors into account. Eventually, new models examining how other factors (such as personality traits, self esteem, trauma and interpersonal conflict) interact with reasons for use and coping to influence substance use outcome should be developed and tested.

Replication of the results of the ESM study is needed to demonstrate the generalisability of the findings and a larger psychosis group is required in order to have sufficient power to test for group differences. Future ESM studies should also include measures of symptom distress and seek to examine the relationship between symptoms, affect and substance use in a wider variety of substance users. There have been a number of studies employing experience sampling methodology with alcohol users in non-clinical samples but none with individuals with psychosis.

8.8. Summary of clinical implications

The clinical implications of the findings are discussed in the individual chapters. This subsection summarises the ways in which the results can inform practice.

The research has highlighted the influence that reasons for use have on problematic drug and alcohol by people with psychosis and suggests that treatments focusing on substance use and psychotic symptoms without addressing the role of reasons for use may be limited. Furthermore, the finding that coping reasons for use mediate the relationship between symptoms and substance use suggests that interventions should particularly target those with coping reasons for use.

The finding that the relationship between coping reasons for use and negative consequences from substance use is mediated by coping strategies for alcohol users but not users of other substances (if replicated) may suggest that drinkers with psychosis may require differently focused interventions to the users of other substances.

Cognitive Behavioural therapy for people with psychosis is based on working towards a shared understanding of the development of symptoms. For those who use drugs and alcohol, the ability to identify the relationship between substance use and psychotic symptoms in terms of a case formulation is a good starting point (Graham, 1998). Motivational interviewing, which seeks to help clients understand the impact of substance use by helping them to recognise the relationship of their substance use to their personal life goals may be a particularly useful intervention for all individuals with psychosis using substances. Subsequent interventions should take self reported reasons for use into account and seek to explore and acknowledge the perceived benefits of use. For individuals who report using substances to cope with distressing emotions and symptoms interventions should aim to help them identify the situations (including moods and symptoms) which lead to substance use and to develop alternative coping skills for handling those situations. Those who are motivated by social and individual enhancement reasons and who may be using substances to facilitate social relationships interventions or to increase positive affect may instead require assistance developing a wider repertoire of enhancement skills.

8.9. Conclusions

This programme of research represents significant progress in the study of substance use by people with psychosis. It resulted in the development and validation of a new questionnaire measure to assess reasons for substance use and has advanced the literature on substance use in psychosis by establishing the salience of coping reasons for use when predicting substance use behaviour and consequences. It has found some evidence of a mediating role of dysfunctional coping strategies for some sub groups which warrants further investigation. There are methodological limitations associated with the studies included in this thesis and future research will need to address these. Nonetheless, the findings lend credence to a cognitive motivational perspective on substance use and suggest that future research and clinical work in psychosis and substance use comorbidity should take reasons for use into account. Further examination of these relationships will lead to implications for treatments designed to help people with psychosis abstain from or reduce their substance use and possibly early intervention initiatives.

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APPENDIX 1.

Reasons for Substance use in Schizophrenia questionnaire

Reasons for substance use questionnaire: ReSUS A

Subject No_____ Date_____

We are interested in finding out more about the situations in which people drink alcohol. The list below describes a number of situations in which drinking often takes place.

Please read each item carefully and tell us whether you drink alcohol in each of these situations by circling one of the numbers next to it. There are no 'right' or 'wrong' answers, choose the most accurate answer for you.

I drink alcohol .....

	Never	Sometimes	Often	Almost always
When I want to feel drunk	**1**	**2**	**3**	**4**
When I am bored and want something to do to pass the time	**1**	**2**	**3**	**4**
When I start to feel guilty about something or feel that I have let myself down	**1**	**2**	**3**	**4**
When I am feeling suspicious or paranoid	**1**	**2**	**3**	**4**
When I am having trouble communicating with others	**1**	**2**	**3**	**4**
When I want to chill out, relax or feel calm	**1**	**2**	**3**	**4**
When I am feeling stressed	**1**	**2**	**3**	**4**
When I am angry at the way things have turned out	**1**	**2**	**3**	**4**
When I am feeling depressed	**1**	**2**	**3**	**4**
When my thoughts are racing	**1**	**2**	**3**	**4**
When I am feeling lonely	**1**	**2**	**3**	**4**
When I am having trouble thinking or concentrating	**1**	**2**	**3**	**4**
When I want to 'feel different' or alter my state of mind	**1**	**2**	**3**	**4**
When I want to feel good, have a laugh or be happier	**1**	**2**	**3**	**4**
When I want to feel sexy or increase my sexual enjoyment	**1**	**2**	**3**	**4**
When I want to stay awake, be more alert, or be more energetic	**1**	**2**	**3**	**4**
When I am thinking about bad things that have happened to me in the past	**1**	**2**	**3**	**4**
When I want to feel more creative	**1**	**2**	**3**	**4**

I drink alcohol .....

	Never	Sometimes	Often	Almost always
When I feel anxious or tense	**1**	**2**	**3**	**4**
When I am hearing sounds or voices that other people can't hear	**1**	**2**	**3**	**4**
When I want to fit in with other people	**1**	**2**	**3**	**4**
When I think about how good it tastes	**1**	**2**	**3**	**4**
When I am experiencing medication side effects	**1**	**2**	**3**	**4**
When I feel ashamed or bad about myself	**1**	**2**	**3**	**4**
When I want to escape from my problems and worries	**1**	**2**	**3**	**4**
When I have trouble sleeping	**1**	**2**	**3**	**4**
When I am with friends and we want to have a good time	**1**	**2**	**3**	**4**
When I want to feel more confident	**1**	**2**	**3**	**4**
When I am experiencing unpleasant thoughts	**1**	**2**	**3**	**4**
When I feel excited about something	**1**	**2**	**3**	**4**
When I want to feel more self aware	**1**	**2**	**3**	**4**
When I have been taking drugs and think about drinking alcohol	**1**	**2**	**3**	**4**
When I unexpectedly find some alcohol or happen to see something that reminds me of drinking alcohol	**1**	**2**	**3**	**4**
When I feel under pressure from other people to drink alcohol	**1**	**2**	**3**	**4**
When I feel I have been discriminated against	**1**	**2**	**3**	**4**
When I am in pain physically	**1**	**2**	**3**	**4**
When I am happy and feeling content with my life	**1**	**2**	**3**	**4**
When I want to feel normal	**1**	**2**	**3**	**4**
When I want to feel more emotions	**1**	**2**	**3**	**4**
When I need motivation to do things	**1**	**2**	**3**	**4**

Reasons for substance use questionnaire: ReSUS D

Subject No _____ Date_____

We are interested in finding out more about the situations in which people use drugs. The list below describes a number of situations in which drug use often takes place.

Please read each item carefully and tell us whether you use _____ in each of these situations by circling one of the numbers next to it. There are no 'right' or 'wrong' answers, choose the most accurate answer for you.

I use _____ .....

	Never	Sometimes	Often	Almost always
When I want to feel stoned or high	**1**	**2**	**3**	**4**
When I am bored and want something to do to pass the time	**1**	**2**	**3**	**4**
When I start to feel guilty about something or feel that I have let myself down	**1**	**2**	**3**	**4**
When I am feeling suspicious or paranoid	**1**	**2**	**3**	**4**
When I am having trouble communicating with others	**1**	**2**	**3**	**4**
When I want to chill out, relax or feel calm	**1**	**2**	**3**	**4**
When I am feeling stressed	**1**	**2**	**3**	**4**
When I am angry at the way things have turned out	**1**	**2**	**3**	**4**
When I am feeling depressed	**1**	**2**	**3**	**4**
When my thoughts are racing	**1**	**2**	**3**	**4**
When I am feeling lonely	**1**	**2**	**3**	**4**
When I am having trouble thinking or concentrating	**1**	**2**	**3**	**4**
When I want to 'feel different' or alter my state of mind	**1**	**2**	**3**	**4**
When I want to feel good, have a laugh or be happier	**1**	**2**	**3**	**4**
When I want to feel sexy or increase my sexual enjoyment	**1**	**2**	**3**	**4**
When I want to stay awake, be more alert, or be more energetic	**1**	**2**	**3**	**4**
When I am thinking about bad things that have happened to me in the past	**1**	**2**	**3**	**4**

I use _____ .....

	Never	Sometimes	Often	Almost always
When I want to feel more creative	**1**	**2**	**3**	**4**
When I feel anxious or tense	**1**	**2**	**3**	**4**
When I am hearing sounds or voices that other people can't hear	**1**	**2**	**3**	**4**
When I want to fit in with other people	**1**	**2**	**3**	**4**
When I think about how good it tastes	**1**	**2**	**3**	**4**
When I am experiencing medication side effects	**1**	**2**	**3**	**4**
When I feel ashamed or bad about myself	**1**	**2**	**3**	**4**
When I want to escape from my problems and worries	**1**	**2**	**3**	**4**
When I have trouble sleeping	**1**	**2**	**3**	**4**
When I am with friends and we want to have a good time	**1**	**2**	**3**	**4**
When I want to feel more confident	**1**	**2**	**3**	**4**
When I am experiencing unpleasant thoughts	**1**	**2**	**3**	**4**
When I feel excited about something	**1**	**2**	**3**	**4**
When I want to feel more self aware	**1**	**2**	**3**	**4**
When I have been drinking and think about using these drugs	**1**	**2**	**3**	**4**
When I unexpectedly find some drugs or happen to see something that reminds me of taking drugs	**1**	**2**	**3**	**4**
When I feel under pressure from other people to take drugs	**1**	**2**	**3**	**4**
When I feel I have been discriminated against	**1**	**2**	**3**	**4**
When I am in pain physically	**1**	**2**	**3**	**4**
When I am happy and feeling content with my life	**1**	**2**	**3**	**4**
When I want to feel normal	**1**	**2**	**3**	**4**
When I want to feel more emotions	**1**	**2**	**3**	**4**
When I need motivation to do things	**1**	**2**	**3**	**4**

APPENDIX 2.

Items excluded from the ReSUS questionnaire

Q sort items excluded from the ReSUS questionnaire

Reason:	
Infrequent Endorsement	When I want to lose weight
	When I want to experience more voices
	When I want to think more, or increase the number of thoughts I am having
	When I want to work and study better
	When I am using other drugs and want to enhance their effects or 'come down'
	When I want to increase my appetite
	When I want to see whether I can take drugs in moderation
	When other people reject me or don't seem to like me
	When I feel that my family is putting a lot of pressure on me or that I don't measure up to their expectations
	When I am not getting along well with others at school or at work
	When there are arguments or fights at home
	When I feel that someone is trying to control me and I want to feel more independent
Similitude	
	When I feel confident and relaxed
	When I feel tense or uneasy in the presence of someone
	When I have something to celebrate
	When I feel I need courage to face up to people socially
	When other people treat me unfairly or interfere with my plans
	When I am invited to someone's home and feel awkward about refusing when they offer me drugs / alcohol

APPENDIX 3.

Brief COPE questionnaire

Brief COPE

We are interested in how people respond when they confront difficult or stressful events in their lives. There are lots of ways to try to deal with stress. This questionnaire asks you to indicate what you generally do and feel, when you experience stressful events. Obviously, different events bring out somewhat different responses, but think about what you usually do when you are under a lot of stress.

Then respond to each of the following items by circling one number on your answer sheet for each, using the response choices listed just below. Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully, and make your answers as true FOR YOU as you can. Please answer every item. There are no "right" or "wrong" answers, so choose the most accurate answer for YOU -not what you think "most people" would say or do. Indicate what YOU usually do when YOU experience a stressful event.

		I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot
1	I turn to work or other activities to take my mind off things	**1**	**2**	**3**	**4**
2	I concentrate my efforts on doing something about the situation I'm in	**1**	**2**	**3**	**4**
3	I say to myself "this isn't real."	**1**	**2**	**3**	**4**
4	I use alcohol or other drugs to make myself feel better.	**1**	**2**	**3**	**4**
5	I try to get emotional support from others.	**1**	**2**	**3**	**4**
6	I just give up trying to deal with it	**1**	**2**	**3**	**4**
7	I take action to try to make the situation better	**1**	**2**	**3**	**4**
8	I refuse to believe that it has happened.	**1**	**2**	**3**	**4**
9	I say things to let my unpleasant feelings escape	**1**	**2**	**3**	**4**
10	I get help and advice from other people	**1**	**2**	**3**	**4**
11	I use alcohol or drugs to help me get through it.	**1**	**2**	**3**	**4**
12	I try to see it in a different light, to make it seem more positive.	**1**	**2**	**3**	**4**
13	I criticize myself	**1**	**2**	**3**	**4**
14	I try to come up with a strategy about what to do.	**1**	**2**	**3**	**4**
15	I get comfort and understanding from someone.	**1**	**2**	**3**	**4**

		I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot
16	I give up attempting to cope	**1**	**2**	**3**	**4**
17	I look for something good in what is happening.	**1**	**2**	**3**	**4**
18	I make jokes about it.	**1**	**2**	**3**	**4**
19	I do something to think about it less, such as going to the movies, watching TV, reading, daydreaming, sleeping or shopping	**1**	**2**	**3**	**4**
20	I accept the reality of the fact that it happened.	**1**	**2**	**3**	**4**
21	I express my negative feelings	**1**	**2**	**3**	**4**
22	I try to find comfort in my religion or spiritual beliefs	**1**	**2**	**3**	**4**
23	I try to get advice or help from other people about what to do	**1**	**2**	**3**	**4**
24	I learn to live with it.	**1**	**2**	**3**	**4**
25	I think hard about what steps to take.	**1**	**2**	**3**	**4**
26	I blame myself for things that have happened	**1**	**2**	**3**	**4**
27	I pray or meditate	**1**	**2**	**3**	**4**
28	I make fun of the situation.	**1**	**2**	**3**	**4**

APPENDIX 4.

Inventory of Drug Use Consequences

ID Number:_____ Observation Period _____ Date _____

Here are a number of events that people sometimes experience in relation to their use of alcohol and other drugs. Read each one carefully, and indicate how often each one has happened to you in the past 3 months by circling the appropriate number (0 = never; 1 = once or a few times; 2 = once or twice a week; 3 = daily or almost daily). If an item does not apply to you, circle zero (0). Circle one answer for each item.

In the last three months, how often has this applied to you:	**Never**	**Once or a few times**	**Once or twice a week**	**Daily or almost daily**
1. I have been unhappy because of my drinking or drug use	**0**	**1**	**2**	**3**
2. Because of my drinking or drug use, I have lost weight or not eaten properly	**0**	**1**	**2**	**3**
3. I have failed to do what is expected of me because of my drinking or drug use	**0**	**1**	**2**	**3**
4. When drinking or using drugs my personality has changed for the worse	**0**	**1**	**2**	**3**
5. I have taken foolish risks when I have been drinking or using drugs	**0**	**1**	**2**	**3**
6. While drinking or using drugs, I have said harsh or cruel things to someone	**0**	**1**	**2**	**3**
7. When drinking or using drugs, I have done impulsive things that I regretted later	**0**	**1**	**2**	**3**
8. I have had money problems because of my drinking or drug use	**0**	**1**	**2**	**3**
9. My physical appearance has been harmed by my drinking or drug use	**0**	**1**	**2**	**3**
10. My family have been hurt by my drinking or drug use	**0**	**1**	**2**	**3**
11. A friendship or close relationship has been damaged by my drinking or drug use	**0**	**1**	**2**	**3**
12. I have lost interest in activities and hobbies because of my drinking or drug use	**0**	**1**	**2**	**3**
13. My drinking or drug use has gotten in the way of my growth as a person	**0**	**1**	**2**	**3**
14. My drinking or drug use has damaged my social life, popularity or reputation	**0**	**1**	**2**	**3**
15. I have spent too much or lost a lot of money because of my drinking or drug use	**0**	**1**	**2**	**3**

APPENDIX 5.

Alcohol Use Disorders Identification Test

ID Number:_____ Observation Period _____ Date ____

These questions refer to your use of alcohol. Please circle the answer that is correct for you.

1. How often do you have a drink containing alcohol?

0	1	2	3	4
Never	Monthly or less	2 to 4 times a month	2 to 3 times a week	4 or more times a week

2. How many drinks containing alcohol do you have a on a typical day when you are drinking?

0	1	2	3	4
1 or 2	3 or 4	5 or 6	7 to 9	10 or more

3. How often do you have six or more drinks on one occasion?

0	1	2	3	4
Never	Less than Monthly	Monthly	Weekly	Daily or almost daily

4. How often during the last year have you found that you were not able to stop drinking once you had started?

0	1	2	3	4
Never	Less than Monthly	Monthly	Weekly	Daily or almost daily

5. How often during the last year have you failed to do what was normally expected from you because of drinking?

0	1	2	3	4
Never	Less than Monthly	Monthly	Weekly	Daily or almost daily

6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?

0	1	2	3	4
Never	Less than Monthly	Monthly	Weekly	Daily or almost daily

7. How often during the last year have you had a feeling of guilt or remorse after drinking?

0	1	2	3	4
Never	Less than Monthly	Monthly	Weekly	Daily or almost daily

8. How often during the last year have you been unable to remember what happened the night before because you had been drinking?

0	1	2	3	4
Never	Less than Monthly	Monthly	Weekly	Daily or almost daily

9. Have you or someone else been injured as a result of your drinking?

0	1	2	3	4
Never	Less than Monthly	Monthly	Weekly	Daily or almost daily

10. Has a relative or friend or a doctor or other health worker been concerned about your drinking or suggested you cut down?

0	1	2	3	4
Never	Less than Monthly	Monthly	Weekly	Daily or almost daily

APPENDIX 6.

Drug Abuse Screening Test

ID Number:_____ Observation Period _____ Date _____

The following questions concern information about your potential involvement with drugs **not including alcoholic beverages.** During the past 3 months. Carefully read each statement and decide if your answer is 'Yes' or 'No'. Then, circle the appropriate response beside the question.

Please answer every question. If you have difficulty with a statement, then choose the response that is mostly right.

1. Have you used drugs other than those required for medical reasons?	**Yes**	**No**
2. Have you abused prescription drugs?	**Yes**	**No**
3. Do you abuse more than one drug at a time?	**Yes**	**No**
4. Can you get through the week without using drugs?	**Yes**	**No**
5. Are you always able to strop using drugs if you want to?	**Yes**	**No**
6. Have you had 'blackouts' or 'flashbacks' as a result of drug use?	**Yes**	**No**
7. Do you ever feel bad or guilty about your drug use?	**Yes**	**No**
8. Does your spouse (or parents) ever complain about your involvement with drugs?	**Yes**	**No**
9. Has drug abuse created problems between you and your spouse or your parents?	**Yes**	**No**
10. Have you lost friends because of your use of drugs?	**Yes**	**No**
11. Have you neglected your family because of your use of drugs?	**Yes**	**No**
12. Have you been in trouble at work because of drug abuse?	**Yes**	**No**
13. Have you lost a job because of drug abuse?	**Yes**	**No**
14. Have you gotten into fights when under the influence of drugs?	**Yes**	**No**
15. Have you engaged in illegal activities in order to obtain drugs?	**Yes**	**No**
16. Have you been arrested for possession of illegal drugs?	**Yes**	**No**
17. Have you ever experienced withdrawal symptoms (felt sick) when you stopped taking drugs?	**Yes**	**No**
18. Have you had medical problems as a result of your drug use (eg memory loss, hepatitis, convulsions, bleeding etc)?	**Yes**	**No**
19. Have you gone to anyone for help for a drug problem?	**Yes**	**No**
20. Have you been involved in a treatment program specifically related to drug use?	**Yes**	**No**

APPENDIX 7.

Timeline Followback

Outcomes derived from the Timeline Followback Method

To record 90 days of substance use:

Alcohol (in units) and drugs (in grams where possible or other units, e.g. joints of cannabis)
Also, cost of drugs used.

90 days summed as follows:

Number of days abstinent from cannabis use
Number of days abstinent from all substances
Total units of alcohol consumed over 90 days
Total cost of cannabis used over 90 days
Total cost of all drugs used over 90 days
Total weight (grams of drugs used over 90 days)

30 day summary (the most recent 30 days of the 90)

Number of days abstinent from cannabis use
Number of days abstinent from all substances
Total units of alcohol consumed over 30 days
Total cost of cannabis used over 30 days
Total cost of all drugs used over 30 days
Total weight (grams of drugs used over 30 days)

Timeline Followback calendar

ID Number _____Observation Period _____ Date_____

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

APPENDIX 8.

PANSS Score Sheet

PANSS SCORESHEET

ID Number:_____ DOB_____

Date _____ Rater _____

Positive Scale		**ABS**	**MIN**	**MILD**	**MOD**	**SEV**	**SEV**	**EXT**
P1 Delusions	**P1**	1	2	3	4	5	6	7
P2 Conceptual disorganisation	**P2**	1	2	3	4	5	6	7
P3 Hallucinatory behaviour	**P3**	1	2	3	4	5	6	7
P4 Excitement	**P4**	1	2	3	4	5	6	7
P5 Grandiosity	**P5**	1	2	3	4	5	6	7
P6 Suspiciousness/ persecution	**P6**	1	2	3	4	5	6	7
P7 Hostility	**P7**	1	2	3	4	5	6	7
Negative Scale								
N1 Blunted affect	**N1**	1	2	3	4	5	6	7
N2 Emotional withdrawal	**N2**	1	2	3	4	5	6	7
N3 Poor rapport	**N3**	1	2	3	4	5	6	7
N4 Passive/apathetic soc. with.	**N4**	1	2	3	4	5	6	7
N5 Diff. in abstract thinking	**N5**	1	2	3	4	5	6	7
N6 Lack of spontaneity and flow of conversation	**N6**	1	2	3	4	5	6	7
N7 Stereotyped thinking	**N7**	1	2	3	4	5	6	7
General Scale								
G1 Somatic concern	**G1**	1	2	3	4	5	6	7
G2 Anxiety	**G2**	1	2	3	4	5	6	7
G3 Guilt feelings	**G3**	1	2	3	4	5	6	7
G4 Tension	**G4**	1	2	3	4	5	6	7
G5 Mannerisms and posturing	**G5**	1	2	3	4	5	6	7
G6 Depression	**G6**	1	2	3	4	5	6	7
G7 Motor retardation	**G7**	1	2	3	4	5	6	7
G8 Uncooperativeness	**G8**	1	2	3	4	5	6	7
G9 Unusual thought content	**G9**	1	2	3	4	5	6	7
G10 Disorientation	**G10**	1	2	3	4	5	6	7
G11 Poor attention	**G11**	1	2	3	4	5	6	7
G12 Lack of judgement and insight	**G12**	1	2	3	4	5	6	7
G13 Disturbance of volition	**G13**	1	2	3	4	5	6	7
G14 Poor impulse control	**G14**	1	2	3	4	5	6	7
G15 Preoccupation	**G15**	1	2	3	4	5	6	7
G16 Active social avoidance	**G16**	1	2	3	4	5	6	7

APPENDIX 9.

PSYRATS Score Sheets

PSYRATS DELUSIONS: SCORE SHEET

ID Number_____ Timepoint_____Date_____

SCORE

1. AMOUNT OF PREOCCUPATION ☐

2. DURATION OF PREOCCUPATION ☐

3. CONVICTION ☐

4. AMOUNT OF DISTRESS ☐

5. INTENSITY OF DISTRESS ☐

6. DISRUPTION ☐

PSYRATS AUDITORY HALLUCINATIONS: SCORE SHEET

ID Number_____ Timepoint_____Date_____

1. FREQUENCY ☐
2. DURATION ☐
3. LOCATION ☐
4. LOUDNESS ☐
5. BELIEFS RE-ORIGIN OF VOICES ☐
6. AMOUNT OF NEGATIVE CONTENT OF VOICES ☐
7. DEGREE OF NEGATIVE CONTENT ☐
8. AMOUNT OF DISTRESS ☐
9. INTENSITY OF DISTRESS ☐
10. DISRUPTION ☐
11. CONTROL ☐

APPENDIX 10.

Calgary Depression Scale

Calgary Depression Scale

ID Number:_____ Observation Period _____ Date _____

Interviewer: Ask the first question as written. Use follow up probes or qualifiers at your discretion.. N.B. The last item (9) is based on observations of the entire interview.

1. DEPRESSION: How would you describe your mood over the last two weeks? Do you keep reasonably cheerful or have you been very depressed or low spirited recently? In the last two weeks how often have you (own words) every day? All day?
0. Absent
1. Mild: Expresses some sadness or discouragement on questioning.
2. Moderate: Distinct depressed mood persisting up to half the time over last 2 weeks: present daily.
3. Severe: Markedly depressed mood persisting daily over half the time interfering with normal motor and social functioning.

2. HOPELESSNESS: How do you see the future for yourself? Can you see any future? - or has life seemed quite hopeless? Have you given up or does there still seem some reason for trying?
0. Absent
1. Mild: Has at times felt hopeless over the last two weeks but still has some degree of hope for the future.
2. Moderate: Persistent, moderate sense of hopelessness over last week. Can be persuaded to acknowledge possibility of things being better.
3. Severe: Persisting and distressing sense of hopelessness.

3. SELF DEPRECIATION: What is your opinion of your self compared to other people? Do you feel better, not as good, or about the same as other? Do you feel inferior or even worthless?
0. Absent
1. Mild: Some inferiority; not amounting to feeling of worthlessness.
2. Moderate: Subject feels worthless, but less than 50% of the time.
3. Severe: Subject feels worthless more than 50% of the time. May be challenged to acknowledge otherwise.

4. GUILTY IDEAS OF REFERENCE: Do you have the feeling that you are being blamed for something or even wrongly accused? What about? (Do not include justifiable blame or accusation. Exclude delusions of guilt.)
0. Absent
1. Mild: Subject feels blamed but not accused less than 50% of the time.
2. Moderate: Persisting sense of being blamed, and/or occasional sense of being accused.
3. Severe: Persistent sense of being accused. When challenged, acknowledges that it is not so.

5. PATHOLOGICAL GUILT: Do you tend to blame yourself for little things you may have done in the past? Do you think that you deserve to be so concerned about this?
0. Absent
1. Mild: Subject sometimes feels over guilty about some minor peccadillo, but less than 50% of time.
2. Moderate: Subject usually (over 50% of time) feels guilty about past actions the significance of which he exaggerates.
3. Severe: Subject usually feels s/he is to blame for everything that has gone wrong, even when not his/her fault.

6. MORNING DEPRESSION: When you have felt depressed over the last 2 weeks have you noticed the depression being worse at any particular time of day?
0. Absent: No depression.
1. Mild Depression: present but no diurnal variation.
2. Moderate Depression: spontaneously mentioned to be worse in a.m.
3. Severe Depression: markedly worse in a.m., with impaired functioning which improves in p.m.

7. EARLY WAKENING: Do you wake earlier in the morning than is normal for you? How many times a week does this happen?
0. Absent: No early wakening.
1. Mild: Occasionally wakes (up to twice weekly) 1 hour or more before normal time to wake or alarm time.
2. Moderate: Often wakes early (up to 5 times weekly) 1 hour or more before normal time to wake or alarm.
3. Severe: Daily wakes 1 hour or more before normal time.

8. SUICIDE: Have you felt that life wasn't worth living? Did you ever feel like ending it all? What did you think you might do? Did you actually try?
0. Absent
1. Mild: Frequent thoughts of being better off dead, or occasional thoughts of suicide.
2. Moderate: Deliberately considered suicide with a plan, but made no attempt.
3. Severe: Suicidal attempt apparently designed to end in death (i.e.: accidental discovery of inefficient means).

9. OBSERVED DEPRESSION: Based on interviewer's observations during the entire interview. The question "Do you feel like crying?" used at appropriate points in the interview, may elicit information useful to this observation.
0. Absent
1. Mild: Subject appears sad and mournful even during parts of the interview, involving affectively neutral discussion.
2. Moderate: Subject appears sad and mournful throughout the interview, with gloomy monotonous voice and is tearful or close to tears at times.
3. Severe: Subject chokes on distressing topics, frequently sighs deeply and cries openly, or is persistently in a state of frozen misery if examiner is sure that this is present.

APPENDIX 11.

Global Assessment of Functioning Scale

ID Number:_____Observation Period/Date_____ Rater_____

Consider psychological, social, and occupational functioning on a hypothetical continuum of mental illness. Do not include impairment in functioning due to physical (or environmental) limitations.

Code **(note: Use intermediate codes when appropriate, e.g. 45, 68 or 72)**

100 | 91 Superior functioning in a wide range of activities. Life's problems never seem to get out of hand, is sought out by others because of his or her many positive qualities. No symptoms.

90 | | 81 Absent or minimal symptoms (e.g. mild anxiety before an exam), good functioning in all areas, interested and involved in a wide range of activities, socially effective, generally satisfied with life, no more than everyday problems or concerns (e.g. an occasional argument with family members).

80 | 71 If symptoms are present, they are transient and expectable reactions to psychosocial stressors (e.g. difficulty concentrating after family argument): no more than slight impairment in social, occupational, or school functioning (e.g. temporarily falling behind in schoolwork).

70 | 61 Some mild symptoms (e.g. depressed mood and mild insomnia) OR some difficulty in social, occupational, or school functioning (e.g. occasional truancy, or theft within the household), but generally functioning pretty well, has some meaningful interpersonal relationships.

60 | 51 Moderate symptoms (e.g. flat affect and circumstantial speech, occasional panic attacks) OR moderate difficulty in social, occupational or school functioning (e.g. few friends, conflict with peers or co-workers).

50 | 41 Serious symptoms (e.g. suicidal ideation, severe obsessional rituals, frequent shoplifting) OR any serious impairment in social, occupational, or school functioning (e.g. no friends, unable to keep a job).

40 | | 31 Some impairment in reality testing or communication (e.g. speech is at times illogical, obscure or irrelevant) OR major impairment in several areas, such as work or school, family relations, judgement, thinking, or mood (e.g. depressed man avoids friends, neglects family and is unable to work: child frequently beats up younger children, is defiant at home and is failing at school.

30 | | 21 Behaviour is considerably influenced by delusions or hallucinations OR serious impairment in communication or judgement (e.g. sometimes incoherent, acts grossly inappropriately, suicidal preoccupation) OR inability to function in almost all areas (e.g. stays in bed all day, no job, home or friends).

20 | | 11 Some danger of hurting self or others (e.g. suicide attempts without clear expectation of death; frequently violent; manic excitement) OR occasionally fails to maintain minimal personal hygiene (e.g. smears faeces) OR gross impairment in communication (e.g. largely incoherent or mute).

10 | 1 Persistent danger of severely hurting self or others (e.g. recurrent violence) OR persistent inability to maintain minimal personal hygiene OR serious suicidal act with clear expectation of death.

0 Inadequate information.

APPENDIX 12.

ESM Diary Questions

What was I thinking (just before the beep)? ……

……

This thought was…	Not			Moderate			Very
Pleasant	1	2	3	4	5	6	7
Clear	1	2	3	4	5	6	7
Normal	1	2	3	4	5	6	7
I have trouble concentrating	1	2	3	4	5	6	7

At this moment I feel…	Not			Moderate			Very
Cheerful	1	2	3	4	5	6	7
Agitated	1	2	3	4	5	6	7
Lonely	1	2	3	4	5	6	7
Relaxed	1	2	3	4	5	6	7
	Not			Moderate			Very
Anxious	1	2	3	4	5	6	7
Satisfied	1	2	3	4	5	6	7
Irritated	1	2	3	4	5	6	7
Sad	1	2	3	4	5	6	7
	Not			Moderate			Very
Guilty	1	2	3	4	5	6	7
Bored	1	2	3	4	5	6	7
Happy	1	2	3	4	5	6	7
Angry	1	2	3	4	5	6	7
	Not			Moderate			Very
Overall I feel good	1	2	3	4	5	6	7

My thoughts are…	Not			Moderate			Very
Racing	1	2	3	4	5	6	7
Suspicious	1	2	3	4	5	6	7
Hard to express	1	2	3	4	5	6	7
Influenced by others	1	2	3	4	5	6	7
I cannot get rid of my thoughts	1	2	3	4	5	6	7
I feel unreal	1	2	3	4	5	6	7
I hear voices	1	2	3	4	5	6	7
I see things	1	2	3	4	5	6	7
I'm afraid to lose control	1	2	3	4	5	6	7

Where am I ? ……

Am I alone? No ☐ Yes ☐

If not, who am I with?

……

How many men? ……/ women?……/ Children? ……

	Not			Moderate			Very
I like this company	1	2	3	4	5	6	7
I'd rather be alone	1	2	3	4	5	6	7
We're doing something together	1	2	3	4	5	6	7
We are getting on well	1	2	3	4	5	6	7

What am I doing?..... ……

……

	Not			Moderate			Very
I'd rather be doing something else	1	2	3	4	5	6	7
I am actively doing something	1	2	3	4	5	6	7
This activity is challenging	1	2	3	4	5	6	7
I'm skilled at it	1	2	3	4	5	6	7

	Not			Moderate			Very
I feel well	1	2	3	4	5	6	7
I feel tired	1	2	3	4	5	6	7
I am in pain	1	2	3	4	5	6	7
I am hungry	1	2	3	4	5	6	7

I am LYING DOWN/ SITTING/ STANDING/ WALKING (please circle your choice)

Since the last beep I've used:

Nothing ☐ Coffee ☐ Tobacco ☐ Alcohol ☐ Cannabis ☐ Other drug 1 ☐ Please write in …… Other drug 2 ☐ Please write in ……

Since the last beep, the most significant thing that happened to me was:……..…...

……

……

This event was:

very unpleasant -3 -2 -1 0 1 2 3 very pleasant

This beep disturbed me	Not			Moderate			Very
	1	2	3	4	5	6	7

It is now exactly: ……hrs ……min

APPENDIX 13.

Study information sheets, consent forms and invitation emails

INFORMATION SHEET

An investigation into the reasons for alcohol or drug use in people with mental health problems

THANK YOU FOR READING THIS

We would like you to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Why is the study being done?

This study will investigate the reasons people with mental health problems give for using drugs and/or alcohol.

Why have I been chosen?

You are being invited to participate because:
You have a mental health problem
You drink alcohol or use street drugs regularly
Your keyworker has agreed for me to approach you
A total of 50 people will be asked to take part

Do I have to take part?

It is up to you whether or not you decide to take part. If you decide to take part you will be asked to sign a consent form. If you decide to take part you can leave the study at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect the standard of care you receive. If you agree to take part, your involvement could last for as long as nine months although the total duration of the study is three years.

What will happen to me if I take part?

If you agree to take part you will be seen up to three times in total. The researcher will ask you about your alcohol or street drug use and your reasons for drinking or using drugs and the effects that drinking and taking drugs has on you. The researcher will make appointments at times which suit you, and you will be seen at home if that is your preference. Each visit will take approximately 45 minutes.

In addition, some people taking part in the study will be asked to complete a diary form every day for one week after the first visit. **You may decline to fill in the diary and still take part in the study.**

What do I have to do?
To enter the study all you need do is to agree to attend the appointments. These will be made to suit your convenience.

What are the disadvantages and risks of taking part?
There are no identified risks to taking part.

What are the possible benefits of taking part?
The information we get from this study may help us to understand and treat future patients with similar problems better.

Will my taking part be kept confidential?
All information which is collected about you during the course of the research will be kept strictly confidential and will conform to the Data Protection Act of 1998 with respect to data collection, storage and destruction. This will include the information we collect on the help you receive from different sources by accessing your service records held by the Local authority, the NHS, the criminal justice system and other institutions. Any information about you which leaves the hospital or elsewhere will have your name and address removed so that you cannot be recognised from it. With your permission, your GP will be notified of your participation in the study as will your key worker and medical consultant. However, unless there is information which puts you or others at serious risk of harm, information collected in the study will not be fed back or exchanged without your consent.

We will ask for your consent to audiotape the first interview. **You may decline permission for us to use the tape recorder at any time and still take part in the study.**

What will happen to the results of the research study?
We aim to publish the results of the study in a scientific journal but will also make them available to all participants in a non scientific format.

Who is organising and funding the research?
This study is funded by the Medical Research Council. It is organised by the University of Manchester in partnership with a number of NHS trusts.

Contact for further information
If you require further information about the study you may contact **Lynsey Gregg** or [insert name of named contact within the NHS trust]

If you would like to discuss this with someone independent you can call [insert name and address of local independent advocate agency]

Thank you for taking time to read this information and for agreeing to take part in the study.

You will be given a copy of this information sheet and a copy of the signed consent form to keep.

Patient Identification Number:

CONSENT FORM

Title of Project: An investigation into the reasons for alcohol or drug use in people with mental health problems

CONSENT FOR PARTICIPATION IN STUDY

Name of Researcher: Lynsey Gregg

		Please tick yes/no & initial box
1	I confirm that I have read and understand the information sheet dated ..... (version .....) for the above study and have had the opportunity to ask questions.	YES….NO….. ☐
2	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.	YES….NO…. ☐
3	I understand that sections of any of my records held by the Local Authority, the NHS, the criminal justice system and other institutions may be looked at by people who undertake to maintain confidentiality from The University of Manchester working closely with NHS. I give permission for these individuals to have access to my records during my participation in the study. I understand that data collection, storage and destruction will me in line with the Data Protection Act 1998.	YES….NO…. ☐
4	I understand that my GP, my medical consultant and my key worker will be informed of my participation in the study.	YES….NO…. ☐
5	I agree to take part in the above study.	YES….NO…. ☐
	Additional Consents	
7	I give additional consent for the first interview to be audio taped *Declining to do so will not affect my participation in the study in any way.*	YES….NO…. ☐
8	I give additional consent to complete the one week self monitoring diary *Declining to do so will not affect my participation in the study in any way.*	YES….NO…. ☐

Name of Patient	Date	Signature
Researcher	Date	Signature

Email Subject: An investigation into the reasons for alcohol or drug use

Hi,

I am a PhD student in Clinical Psychology at the University of Manchester.
We are looking for people to take part in a study investigating the reasons people give for using drugs and alcohol and the situations that drugs and alcohol use takes place in. We are also interested in finding out about aspects of personality, about how people cope with stresses in their daily lives and how this relates to their alcohol and/or drug use.

The project has been approved by the School of Psychological Sciences Research Ethics Committee (ref no 113/05)

What will I be asked to do if I take part?
If you agree to take part you will be asked to complete a series of questionnaires which are posted on the University internet. These will take up to 45 minutes to complete. Any information you provide will be kept strictly confidential and you can decide to discontinue the study at any time and without giving a reason.

Will I be paid for taking part?
Everyone who takes part will be entered into a prize draw for £75.
Anyone who also completes a second stage to the study can enter another draw for £25.

Where can I obtain further information if I need it?
Further information is available on the website <link to website> If you have any questions about the study, please contact:

Lynsey Gregg
School of Psychological Sciences
Unit 4, Ground Floor
Rutherford House
Manchester Science Park
Lloyd Street North
Manchester M15 6SZ
Email: lgregg@manchester.ac.uk
Tel: 0161 275 8486

INFORMATION SHEET

An investigation into the reasons for alcohol or drug use

THANK YOU FOR READING THIS

We would like you to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Why is the study being done?

This study is being undertaken as part of a PhD qualification. The study aims to investigate the reasons people give for using drugs and/or alcohol by examining self reported reasons for use, coping styles and mood or personality characteristics that are related to vulnerability to mental health problems.

What will happen to me if I take part?
If you agree to take part you will be asked to complete a series of questionnaires posted on the University internet site. You will be asked about your alcohol or street drug use (how often you drink/take drugs and how much you typically consume), your reasons for drinking or using drugs and the situations that this use takes place in. You will also be asked to complete questionnaires about unusual experiences, your mood and about how you cope with daily stresses. Examples of questions about reasons for use/the situations that substance use takes place in include: 'when I am feeling stressed', 'when there are arguments or fights at home', 'when I feel confident and relaxed'. Example questions about mood include: 'I still enjoy the things I used to enjoy' and 'worrying thoughts go through my mind'. Examples of questions about unusual experiences include: 'I sometimes feel as if I'm being followed' or 'I daydream about being someone else'. Examples of questions about coping include: 'I look for something good in what is happening' and 'I blame myself for things that have happened'. Together these will take up to 45 minutes to complete.

You will also be asked whether you would be willing to complete some of the questionnaires again in two weeks time. **You may decline to fill in the questionnaires a second time and still take part in the study.**

Will I be paid for taking part?
Everyone who takes part will have the opportunity to be entered into a prize draw for £75. You will be asked to provide your email address in order for us to identify the winner but you do not have to provide this information in order to participate in the study. Anyone who also completes the second stage to the study can enter another draw for £25.

Will my taking part be kept confidential?
All information which is collected about you during the course of the study will be kept strictly confidential and will conform to the Data Protection Act of 1998 with respect to data collection and storage. If you provide your e-mail address, we will be able to identify you, but your personal details and responses to questionnaires will be stored on separate secure databases. Only the researchers involved in the project will have access to the databases and these will be password protected. No information that would identify you personally will be disclosed to anyone outside of the study and any data presented in reports will be in the form of summary scores across a number of people rather than individual responses.

What will happen to the results of the research study?
We aim to publish the results of the study in a scientific journal but will also make them available to all participants in a non scientific format on the University internet.

Who is organising and funding the research?
This study is funded by the Medical Research Council and organised by the University of Manchester.

The study has been approved by the School of Psychological Sciences Research Ethics Committee (ref no 113/05)

Contact for further information
If you require further information about the study you may contact **Lynsey Gregg** on 0161 275 8486 or at lynsey.gregg@manchester.ac.uk

If you become upset or distressed by any of the questions please contact the study supervisors: Christine Barrowclough or Gill Haddock (0161 275 8488)

Thank you for taking time to read this information

To print this page please click on the print button in your browser.

Please click here to go to the consent form and to begin the study

CONSENT FORM

An investigation into the reasons for alcohol or drug use

1. Have you read the participant information sheet?

Yes / No

2. Have you received enough information about the study?

Yes / No

3. Do you understand that you do not need to take part in the study and if you do enter you are free to withdraw:

- **at any time**
- **without having to give a reason for withdrawing**
- **and without detriment to you?**

Yes / No

4. Do you agree to take part in this study?

Yes / No

To print this page please click on the print button in your browser.

Please click here to begin the study

INFORMATION SHEET

Study title: Cannabis use in daily life: An experience sampling study

We would like you to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

THANK YOU FOR READING THIS

Why is the study being done?

This study will investigate cannabis use in the daily life of people with mental health problems. The study is being conducted as part of an educational study.

Why have I been chosen?

You are being invited to participate because:
You have a mental health problem
You use cannabis regularly
Your keyworker has agreed for me to approach you

A total of 30 people will be asked to take part

Do I have to take part?

It is up to you whether or not you decide to take part. If you decide to take part you will be asked to sign a consent form. If you decide to take part you can leave the study at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect the standard of care you receive. If you agree to take part, your involvement in the study will last for no more than two weeks.

What will happen to me if I take part?

If you agree to take part you will be seen by a researcher up to three times in total over a two week period. You will be asked to complete some assessments (in the form of questionnaires and an interview) and the researcher will ask you about your cannabis use. The researcher will make appointments at times which suit you, and you will be seen at home if that is your preference. In addition, in-between visits from the researcher, you will be asked to wear a watch which will beep at random intervals throughout the day. When you hear the beep you will be asked to fill in a short questionnaire about what you are doing. This should take around two to three minutes to complete. In total you will be asked to fill in 10 questionnaires a day for 6 days.

What do I have to do?
To enter the study all you need do is to agree to fill in the questionnaires and to attend the appointments. These will be made to suit your convenience.

What are the disadvantages and risks of taking part?
There are no identified risks to taking part.

What are the possible benefits of taking part?
There are no direct benefits to taking part. The information we get from this study may help us to understand and treat future patients with similar problems better.

Will I be reimbursed for taking part?
Everybody who completes the diary booklets and attends the appointments with the researcher will be reimbursed £15 at the end of the study.

Will my taking part be kept confidential?
All information which is collected about you during the course of the research will be kept strictly confidential and will conform to the Data Protection Act of 1998 with respect to data collection, storage and destruction. This will include the information we collect on the help you receive from different sources by accessing your records held by the NHS. Any information about you which leaves the hospital or elsewhere will have your name and address removed so that you cannot be recognised from it. With your permission, your GP will be notified of your participation in the study as will your key worker and medical consultant. Information collected in the study will not be fed back or exchanged without your consent unless there is evidence that you are at risk at harming yourself or other people.

We will ask for your consent to audiotape the second interview. **You may decline permission for us to use the tape recorder and still take part in the study.**

What will happen to the results of the research study?
We aim to publish the results of the study in a scientific journal but will also make them available to all participants in a non scientific format.

Who is organising and funding the research?
This study is funded by the Medical Research Council. It is organised by the University of Manchester in partnership with a number of NHS trusts.

Contact for further information
If you require further information about the study you may contact **Lynsey Gregg** or [insert name of named contact within the NHS trust]

If you would like to discuss this with someone independent you can call [insert name and address of local independent advocate agency]

Thank you for taking time to read this information and for agreeing to take part in the study.

You will be given a copy of this information sheet and a copy of the signed consent form to keep.

Patient Identification Number:

CONSENT FORM

Title of Project: Cannabis use in daily life: An experience sampling study

CONSENT FOR PARTICIPATION IN STUDY

Name of Researcher: Lynsey Gregg

		Please tick yes/no & initial box
1	I confirm that I have read and understand the information sheet dated ..... (version .....) for the above study and have had the opportunity to ask questions.	YES….NO….. ☐
2	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.	YES….NO…. ☐
3	I understand that sections of any of my records held by the NHS may be looked at by people who undertake to maintain confidentiality from The University of Manchester working closely with the NHS. I give permission for these individuals to have access to my records during my participation in the study. I understand that data collection, storage and destruction will be in line with the Data Protection Act 1998.	YES….NO…. ☐
4	I understand that my GP, my medical consultant and my key worker will be informed of my participation in the study.	YES….NO…. ☐
5	I agree to take part in the above study.	YES….NO…. ☐
	Additional Consents	
6	I give additional consent for the second interview to be audio taped *Declining to do so will not affect my participation in the study in any way.*	YES….NO…. ☐

Name of Patient	Signature	Date
_____	_____	_____
Researcher	Signature	Date
_____	_____	_____

Email Subject: Invitation to take part in a research project

Cannabis use in daily life: An experience sampling study

Hi, I am a PhD student in Clinical Psychology at the University of Manchester. I am conducting a study investigating cannabis use in daily life. The study aims to find out how thoughts and feelings influence and are influenced by cannabis use. We also aim to find out how people cope with stresses in their daily lives and how this relates to their cannabis use.

Do you live in the Greater Manchester area and smoke cannabis at least three times per week?

If so, you might be eligible to take part

What will I be asked to do if I take part?
The study uses a methodology called 'Experience Sampling'. You will be asked to wear a watch which will beep at random intervals throughout the day. When the watch beeps you will be asked to fill in a short questionnaire about what you are doing. This should take around two to three minutes to complete. You will also be visited by a researcher on two separate occasions: once to explain the study and provide you with the equipment (the watch and questionnaires) and once to return the equipment. You will also be asked to complete two questionnaires at the first visit.

Will I be paid for taking part?
Everyone who takes part will be reimbursed £15

Where can I obtain further information?
Further information is available on the website:

http://www.psych-sci.manchester.ac.uk/clinicalpsychology/lg2/

Please register your interest in the study on the website or contact Lynsey Gregg on 0161 275 8488 or at lynsey.gregg@manchester.ac.uk giving a daytime telephone number. I will call you back within a week.

Any information you provide will be kept strictly confidential and you can decide to discontinue the study at any time and without giving a reason.

Ethical approval for the study has been granted

INFORMATION SHEET

Study title: Cannabis use in daily life: An experience sampling study

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

THANK YOU FOR READING THIS

Why is the study being done?

This study will investigate cannabis use in daily life.

Why have I been chosen?

We are inviting you to participate because you have told us that you use cannabis.

A total of 30 people will be asked to take part

Do I have to take part?

It is up to you whether or not you decide to take part. If you decide to take part you will be asked to sign a consent form. If you decide to take part you can leave the study at any time and without giving a reason. If you agree to take part, your involvement in the study will last for no more than two weeks.

What will happen to me if I take part?

If you agree to take part you will be seen twice by a researcher. You will be asked to complete some questionnaire assessments and the researcher will ask you about your cannabis use. The researcher will make appointments at times which suit you, and you will be seen at home if that is your preference. In addition, in-between visits from the researcher, you will be asked to wear a watch which will beep at random intervals throughout the day. When you hear the beep you will be asked to fill in a short questionnaire about what you are doing. This should take around two to three minutes to complete. The beep will sound 10 times each day.

What do I have to do?

To enter the study all you need do is to agree to fill in the questionnaires and to attend the appointments. These will be made to suit your convenience.

What are the disadvantages and risks of taking part?

There are no identified risks to taking part.

Will I be paid to take part?
Everybody who completes the diary booklets and attends the appointments with the researcher will be paid £15 at the end of the study.

Will my taking part be kept confidential?
All information which is collected about you during the course of the research will be kept strictly confidential and will conform to the Data Protection Act of 1998 with respect to data collection, storage and destruction. Any information about you will have your name and address removed so that you cannot be recognised from it.

What will happen to the results of the research study?
We aim to publish the results of the study in a scientific journal but will also make them available to interested participants in a non scientific format.

Who is organising and funding the research?
This study is funded by the Medical Research Council. It is organised by the University of Manchester in partnership with a number of NHS trusts.

To take part you must be using cannabis on at least three days per week and must be living in the Greater Manchester Area.

If you would like to take part in the study and meet the criteria outlined above please contact:

Lynsey Gregg

Telephone: 0161 275 8488

Email: lynsey.gregg@manchester.ac.uk

Study supervisors: Professor Christine Barrowclough and Professor Gillian Haddock (Tel: 0161 275 8488)

This project has been approved by the School of psychological Sciences Research Ethics Committee

Thank you for taking the time to read this information

Project no
14/06

School of Psychological Sciences

Consent form

Title of Project: Cannabis use in daily life: An experience sampling study

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The participant should complete the following part of this sheet him/herself

Please cross out as necessary

1. Have you read the Participant Information Sheet?	**YES/ NO**
2. Have you received enough information about the study?	**YES/ NO**
3. Do you understand that you do not need to take part in the study and if you do enter you are free to withdraw:- * at any time * without having to give a reason for withdrawing * and without detriment to you?	**YES/ NO**
4. Do you agree to take part in this study?	**YES/ NO**

Name of participant: …… **Signed:** ..... **Date:** .....

Name of researcher: …… **Signed:** ..... **Date:** .....

This project has been approved by the
School of Psychological Sciences Research Ethics Committee