CANNABIS USE IN FIRST-EPISODE PSYCHOSIS; MOTIVATION FOR USE, CHANGE IN USE, AND THE IMPACT OF CANNABIS USE ON SYMPTOMATIC OUTCOME

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ABSTRACT

The use of cannabis has been found to be prognostic of poorer symptomatic outcome among people with first-episode psychosis. It is therefore important to understand what motivates the use of cannabis in this population.

Using a twelve month prospective design this research aimed to quantitatively assess the impact of cannabis use on the symptoms of psychosis, mania, depression and the level of functioning among people with first-episode psychosis. The research also aimed to identify if the motives for cannabis use, such as reasons and expectancy, a person's social network and self-perceived social status may be associated with cannabis use, cessation or abstention. Qualitative methods were also used to explore the factors that the participant perceived to relate to cannabis use and cannabis abstention among people experiencing their first-episode of psychosis.

This research found the continued use of cannabis to be associated with increased severity of mania and to impede recovery in psycho-social functioning. The results suggest that similar reasons and expectancies motivate the use of cannabis in young people with and without psychosis. Concern regarding the potential adverse effect of cannabis use on mental health was found to be influential for cannabis cessation and abstention; and abstention from cannabis was also associated with greater negative cannabis expectancy.

The sample sizes in this research may have meant that a small number of analyses were underpowered to detect significant differences for some variables. Nevertheless, the results of this research highlight the deleterious effect that continued use of cannabis may have for

people experiencing their first-episode of psychosis. Psycho-education regarding the potentially adverse effects of cannabis use may help to enhance current intervention efforts among this population; however intervention must emphasise ‘normal’ motives for cannabis use rather than psychosis specific motives.

For Mum, Dad and Allen

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OVERVIEW

This thesis explores the use of cannabis in people experiencing their first-episode of psychosis (FEP). The research aimed to investigate if the use of cannabis affects the severity of psychotic symptoms during the early stage of psychosis, as well as examining the impact of continued cannabis use, cannabis cessation and cannabis abstention on symptomatic outcome in FEP.

The thesis also aimed to explore the factors that motivate the use of cannabis, and change in cannabis use. The motives for cannabis use, the influence of social networks and social status were explored in relation to cannabis use behaviour during the early stage of psychosis. The research also examined the factors perceived by the individual to be influential in the initiation and maintenance of cannabis use, as well as cannabis consumption change and cessation. Lastly, the research aimed to identify if the use of cannabis in psychosis is motivated by psychosis specific factors, therefore the motives for cannabis use were compared between people with and without psychosis who were matched for age and gender.

The research described in this thesis uses both cross-sectional and prospective research paradigms, as well as the use of quantitative and qualitative methodological approaches in order to examine these topics.

Chapter 1

The thesis begins with an overview of the literature regarding the prevalence of cannabis use in the general population and people with psychosis. Evidence is then presented

regarding the first-episode of psychosis as a 'critical period' that may be important in determining the long-term outcome of psychosis. Data is also presented to support the hypothesis that the use of cannabis may be a causal factor in the development of psychosis, or conversely, that the onset of psychosis instead precipitates the development of cannabis use. The chapter concludes with a review of the literature regarding the impact of substance use on the symptoms of psychosis, with a particular focus on the use of cannabis during the first-episode of psychosis.

Chapter 2

Chapter 2 provides an overview of the literature regarding the factors that may influence the use of cannabis among people with psychosis. The chapter reviews the motives for cannabis use, presenting data for reasons for cannabis use and cannabis expectancy. Data is also presented for motives for cannabis use among the general population, and specific attention is paid to matched-design studies that have compared motives for cannabis use among people with and without psychosis. The chapter also reviews the association between social networks and cannabis use in both the general population and people with psychosis. Data relating to the process of social comparison and its relationship to cannabis use is also presented.

Chapter 3

Chapter 3 discusses the methodological shortcomings of previous research and presents the aims of the current programme of research for the thesis.

Chapter 4

Chapter 4 examines the impact of cannabis use during the first-episode of psychosis in a sample of 348 patients followed prospectively over a period of 12 months after entry to treatment for psychosis. The chapter is a secondary analysis of the National EDEN dataset. The National EDEN project[1] was a national, multi-site project that aimed to evaluate the effect of early intervention services for people with psychosis at five sites within the United Kingdom. The analyses found no significant effect of cannabis use on the symptoms of psychosis, but the results suggest that the continued use of cannabis may be associated with increased severity of mania and may impede the recovery of psychological, social and occupational functioning during the early phase of psychotic illness.

Chapter 5

Chapter 5 aimed to extend the results of the National EDEN project and further explore if there is an association between the use of cannabis and the symptoms of psychosis during the early phase of psychotic illness. The study involved the prospective investigation of cannabis use and psychotic symptoms during the first six months after entry to treatment for psychosis. The study also aimed to examine if psychosocial factors such as cannabis expectancy, social networks and perceived social status are associated with the use, cessation and non-use of cannabis among people with psychosis. The study found increased negative cannabis expectancy and association with non-drug using peers to be associated with abstention from cannabis. The results indicate that there was no significant effect of cannabis use on the symptoms of psychosis.

[1] A National of Early Intervention for Psychosis Services: DUP, Service Engagement and Outcome (The National EDEN Project).

Chapter 6

The study aimed to further examine the factors that may be associated with the use and non-use of cannabis among people with first-episode psychosis. The study used qualitative methods to explore the factors perceived by the participant to be influential for cannabis use, cannabis cessation and cannabis abstention. The study was designed to complement the quantitative analysis of the previous chapter. The study found that psychosis specific reasons were not perceived to be influential for the initiation or continued use of cannabis, but psychosis related reasons were perceived to be influential for the decreased use of cannabis, cannabis cessation and cannabis abstention.

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Chapter 7

This study aimed to identify if the use of cannabis among people with first-episode psychosis is motivated by psychosis specific factors, or if the motives for use are broadly similar to motives for cannabis use among people without psychosis. This chapter presents the results of the first matched-design study in a UK patient population; participants with and without psychosis were matched for age and gender, and all participants were in the early stage of treatment. The study also aimed to examine change in the frequency and quantity of cannabis use, the level of dependence and the level of cannabis related problems during the first six months after entry to treatment. The results indicate that the use of cannabis was motivated by similar reasons and expectancy for people with and

without psychosis. The study also found that in contrast to participants without psychosis, there was no significant change in the frequency or quantity of cannabis use over a period of six months for participants with psychosis.

Chapter 8

Chapter 8 summarises the findings of this programme of research, and discusses the clinical implications of the results. The chapter also reviews the knowledge gaps in the existing research literature and recommendations are made for future research.

CHAPTER 1

CANNABIS USE AND PSYCHOSIS

1.0 Overview

This thesis investigates the reasons for using cannabis among people experiencing their first-episode of psychosis, as well as the impact of cannabis use on the symptoms of psychosis. The research focuses on the use of cannabis rather than general substance use as cannabis is the most widely used illicit drug among people with co-occurring psychosis. There is a wealth of literature that links cannabis use to the development of psychosis and suggests that the use of cannabis may adversely affect the symptoms of psychosis, thus understanding the motivations for cannabis use in this population may have important implications for treatment.

This chapter provides an overview of the literature for the prevalence of cannabis use in the general population and then more specifically people with psychosis. Evidence is also presented to suggest that the early stage of psychosis may be especially important for the long-term course of psychotic illness. The proposed causal links between cannabis use and psychosis are reviewed. The chapter concludes by reviewing the evidence regarding the impact of substance use on the symptoms of psychosis.

1.1 Prevalence of cannabis use

The use of cannabis is highly prevalent in both the general population and people with psychosis. This section provides a review of studies on the prevalence of cannabis use.

1.1.1 Prevalence and patterns of cannabis use in the general population

Cannabis is the most widely and frequently used illicit substance in the UK (BCS, 2010), and the use of cannabis is highly prevalent worldwide (UNDOC, 2012). Research documents an increase in the use of cannabis in most developed countries since the early 1990's (Bauman & Phongsavan, 1999), and the rate of cannabis use in Europe is now at historically high levels (Vicente, Olszewski & Matias, 2008).

The lifetime and 12 month prevalence of cannabis use in Europe is estimated to be 22% and 7% respectively, with the UK documented to have the highest 12 month rate of cannabis use in the EU (Vicente et al., 2008). According to the British Crime Survey (2010) the prevalence of 12 month cannabis use is highest among adults aged 16-19. This is likely to reflect the fact that most cannabis initiation occurs during adolescence, with a peak in the level of consumption during late adolescence and the early 20's, and it is not until the mid-twenties that the rate of cannabis use begins to decline (Chen & Kandel, 1995; Vicente et al., 2008).

Recent data suggests that the mean age of onset for cannabis use in the UK has decreased in recent years, from age 18 in 2004 to age 16 in 2010 (BCS, 2004; 2010). Nevertheless, data indicates that the overall prevalence of cannabis use in the UK has slowly declined during the past 10 years, with a marked decrease (27% to 18.5%) among 16-19 years olds

(BCS, 2010). Research also suggests that the use of cannabis is much more prevalent among males than females (BCS, 2010; Kokkevi, Gabhainn & Spyropoulou, 2006; Vicente et al., 2008), and males appear to be at increased risk of earlier initiation of cannabis use (Tu, Ratner & Johnson, 2008). The rate of cannabis use may also vary according to ethnicity, with higher rates of cannabis use among white ethnic groups compared to other ethnic groups (Stinson, Ruan, Pickering & Grant, 2006; Kosterman, Hawkins, Guo, Catalano, & Abbott, 2000; Webb, Ashton, Kelly & Kamali 1996).

There is evidence to suggest that the level of tetrahydrocannabinol (THC), the main psycho-active component of cannabis, has increased in the UK from 3% in 1975 to 13% in 2004, with similar increases in the USA, Italy and The Netherlands (McLaren, Swift, Dillon & Allsop, 2008). This increase in the potency of cannabis has generated much concern regarding the potential implications to health, especially if cannabis use is found to causally relate to the development of psychosis. It is also unclear if, and how, increased concentration of THC in cannabis might affect people with established psychosis. However, it has been suggested that the length of exposure to cannabis (King, 2005) as well as earlier initiation and heavier consumption (Hall & Swift, 2000) may be more important in determining health related problems for cannabis users than increased THC potency. Nevertheless, the long-term implications to mental health of using increased potency cannabis remain unclear.

1.1.2 Prevalence and patterns of cannabis use in people with psychosis

Research indicates that the rate of substance use is significantly higher among people with psychosis compared to the general population (Ringen et al., 2007; Barnett et al., 2007;

Green, Young & Kavanagh, 2005). Epidemiological studies suggest that the lifetime prevalence of substance use in schizophrenia may be as high as 47%, representing a 4.6 increased risk of substance use among people with schizophrenia compared to the general population (Reiger et al., 1990).

Cannabis is the most widely used illicit substance in psychosis (Mueser et al., 1990; Ringen et al., 2008; Fowler, Vaughan, Carter & Lewin, 1998; Menezes, Thornicroft, Marshall, Prosser, Bebbington, & Kuipers, 1996). A comprehensive review of 58 studies by Green et al. (2005) found the prevalence rate of current cannabis misuse among treatment populations to be 42.9%, and lifetime cannabis use was documented to be 53.5%. The review consistently found the rate of substance use in psychosis to be significantly higher compared to the general population, and suggests that people with psychosis may have an increased risk of substance use of between 2.92 - 5.86 for twelve month misuse and 1.58 - 3.98 for twelve month use compared to the general population.

Research suggests that the prevalence of lifetime cannabis use in first-episode psychosis may be as high as 80.3% (Barnett et al., 2007), although the first- episode of psychosis (FEP) appears to be a period of significant change in substance use with high rates of cessation during the early stage of illness (Addington & Addington, 2007; Wade et al., 2006a; Harrison et al., 2008).

Research also indicates that the prevalence of substance use may differ as a result of variability in sample characteristics. The rate of substance use in in-patient settings may be higher compared to out-patient or community samples (Mueser et al., 1990), and has been found to be higher among males (Van Mastrigt, Addington & Addington, 2004;

Hambrecht & Häfner, 1996; Green et al., 2005; Cantwell et al., 1999), and people of younger age (Van Mastrigt et al.,, 2004). The use of different assessment methods between studies, such as the definition and quantification of substance use (i.e. substance use, misuse, abuse or dependence) may also contribute to the reported differences in the prevalence of substance use between studies.

1.2 The relationship between cannabis use and psychosis

It has been proposed that there may be a causal relationship between cannabis use and psychosis, with the use of cannabis leading to the development of later psychosis. Conversely, it has also been proposed that psychosis may precipitate the use of cannabis, perhaps in an attempt to alleviate psychotic symptoms. The following section aims to provide an overview of the evidence for both of these theories.

1.2.1 Is the use of cannabis a causal factor in the onset of psychosis?

There is evidence to suggest that the use of cannabis may increase the risk of psychosis. This section aims to provide an overview of this research.

1.2.1.1 The effect of cannabis use in healthy populations

Early research identified that cannabis use could induce transient psychotic symptoms in healthy populations (Isbell et al., 1967; Chopra & Smith, 1974), leading to the suggestion that cannabis may play a causal role in the onset of psychosis. This finding has been supported by more recent data, with the administration of intravenous THC found to increase positive and negative psychotic symptoms in healthy populations. The effect was

found to be much more pronounced in people with established schizophrenia, demonstrating that people with psychosis may be more sensitive to the effects of cannabis (D'Souza et al, 2005).

1.2.1.2 The vulnerability hypothesis

The vulnerability hypothesis or stress-diathesis model for schizophrenia (see Mueser, Drake & Wallach, 1998 for a review) suggests that environmental factors, such as cannabis use, may interact with existing vulnerability for psychosis, such as a genetic predisposition or a family history of mental health, to precipitate the development of psychosis. Evidence to support this hypothesis comes from a variety of sources. Individuals with schizophrenia and heavy use of cannabis have been found to be more likely to have a family history of schizophrenia (McGuire et al., 1995). The use of cannabis has been suggested to be the stress factor precipitating the onset of psychosis in individuals with genetic liability for schizophrenia (Hambrecht & Häfner, 2000) and the use of cannabis in psychosis is associated with an earlier age of psychosis onset (Veen et al., 2004).

1.2.1.3 Prospective population based research

Further evidence of a causal relationship between the use of cannabis and later onset of psychosis is provided by prospective population based studies. The first population based study suggested that the use of cannabis was associated with the development of psychosis in a dose-response manner (Andréasson, Allbeck, Engström & Rydberg, 1987). The study found that compared to non-users, the use of cannabis at age 18 was associated with a 2.4

increased risk of developing schizophrenia 15 years later, with this risk increasing to 6.0 for heavy cannabis use. This association remained significant (2.3 odds ratio) after controlling for other psychiatric diagnoses at baseline assessment (Andréasson et al., 1987). A re-examination of the same cohort several years later further confirmed these findings with heavy use of cannabis at age 18 associated with a 6.7 increased rate (3.1 adjusted odds ratio) of schizophrenia 27 years later. This association remained significant even after controlling for confounding factors such as diagnosis at baseline, IQ, social integration, place of upbringing and disturbed behaviour (Zammit, Allbeck, Andréasson, Lundberg, & Lewis, 2002).

Similar results have been found in other population based studies. Cannabis use has been found to increase the risk of developing psychotic symptoms in a dose-response manner, independent of other drug use and after controlling for confounding factors and the possibility of reverse causality (van Os et al., 2002). Other prospective studies indicate that the age of first use of cannabis may be important in determining the relative risk of developing psychosis. The use of cannabis before the age of 15 has been found to be associated with an increased likelihood of developing psychotic symptoms at age 26 compared to first use of cannabis at age 18 (Arseneault et al., 2002). This suggests that the use of cannabis during early adolescence may interfere with neurodevelopmental maturational processes that develop during this period, resulting in increased vulnerability to the development of psychosis. Recent prospective research also suggests that the duration of cannabis use may also be important, with longer exposure to cannabis associated with more persistent psychotic symptoms (Kuepper et al., 2011). Taken together the evidence suggests that the use of cannabis may be associated with at least a

twofold increase in the relative risk of schizophrenia (Henquet, Murray, Linszen & van Os, 2005).

1.2.1.4 Neurobiological evidence; dopamine & COMT

There is evidence to indicate that there are shared neurobiological mechanisms in both substance use and schizophrenia, lending further support to cannabis use as a causal factor in the onset of psychosis. The use of cannabis is associated with increased release of dopamine (Stefanis, Engler, Zentner, & Feuerstein, 2004), and increased doperminergic activity is argued to be central in the aetiology of schizophrenia (Davis, Kahn, Grant & Davidson, 1991). Recent research also implicates the role of certain genes in the relationship between cannabis use and psychosis (Caspi et al., 2005), which may go some way to explain why only a minority of individuals who use cannabis go on to later develop psychosis. The evidence is reviewed in greater detail below.

Dopamine

Research indicates that the endocannabinoid and the dopamine systems are closely related (Leweke et al., 2007). The dysfunction of dopamine neurotransmission is heavily implicated in the aetiology of schizophrenia (Forti, Lappin & Murray, 2007). Schizophrenia is thought to be characterised by low prefrontal dopamine resulting in negative symptoms, and excessive mesolimbic dopamine release has been related to the presence and severity of positive psychotic symptoms (Davis et al., 1991; Linszen, Peters & de Haan, 2004; Laruelle et al., 1996). As dopamine is heavily implicated in the pathogenesis of schizophrenia, drugs that activate doperminergic systems may play a role

in the precipitation and exacerbation of schizophrenia. Tetrahydrocannabinol (THC), the main psychoactive compound in cannabis results in increased release of dopamine (Stefanis et al., 2004) and this increase in mesolimbic dopamine is thought to result in increased vulnerability to the development of psychosis (Hall & Solowij, 1998). In addition there is evidence to suggest dopamine sensitisation underlies both substance use and psychosis, and repeated cannabis exposure may result in sensitisation of the endogenous mesolimbic dopamine system (Tsapakis, Guillin & Murray, 2003), which may explain why individuals with schizophrenia are more sensitive to the effects of THC (D'Souza et al., 2005).

Furthermore it has been proposed that substance use in psychosis may increase the risk of psychotic relapse by impacting the regulation of doperminergic transmission (Ashton, 2001), by affecting the dopamine receptor blockade of anti-psychotic medication, or by impacting anti-psychotic drug metabolism, thereby lowering the plasma levels of metabolites (Linszen et al., 2004).

Catecholamine-O-methyl transferase (COMT)

Recently, evidence has emerged regarding the role of Catecholamine-O-methyl transferase (COMT) in the development of psychosis following the use of cannabis. The COMT gene has been found to play an important role in the metabolism of dopamine, in particular in the pre-frontal cortex. The COMT gene contains a functional polymorphism (Val^{158}Met) resulting in two common variants of the enzyme; Val and Met. Individuals with the Met/Met genotype have the lowest COMT activity, whereas those with the Val/Val genotype have the highest activity levels. Increased COMT activity is associated with

reduced dopamine transmission in the pre-frontal cortex, as well as increased levels of meso-limbic dopamine signalling, which is thought to result in increased propensity of experiencing hallucinations and delusions (Henquet et al., 2006b). Further evidence to suggest COMT may be involved in the pathogenesis of psychosis is evidenced by the location of the COMT gene, chromosome 22q11; a region which has been implicated in psychosis using genome scans of schizophrenia (Lewis et al., 2003).

A recent study has found evidence that the COMT gene ($Val^{158}Met$) may interact with adolescent onset cannabis use to precipitate the later development of schizophreniform disorder (Caspi et al., 2005). The study found no interaction between cannabis use during adulthood and COMT, suggesting that adolescence may be a sensitive period of neurobiological vulnerability to cannabis for some people. Also, COMT was not found to precipitate psychosis independent of cannabis use, indicating that COMT may only increase the risk of later psychosis in the context of cannabis use. This finding has been supported and further extended in a double blind placebo controlled study by Henquet and colleagues (2006b). The $Val^{158}Met$ functional polymorphism in the COMT gene was again found to moderate the effect of THC on psychotic symptoms, but only if the individual had an existing predisposition to psychosis. It has also been suggested that dysregulation of dopamine might be the common pathway underlying the association of cannabis and the COMT Val allele on psychosis risk (Caspi et al., 2005).

In summary the evidence suggests that individuals with the COMT Val allele may be at increased risk of developing psychosis following the use of cannabis and this interaction between existing genetic predisposition, COMT, and cannabis use, may explain why only a few individuals who use cannabis go on to later develop psychosis.

1.2.2 Is psychosis a causal factor in the use of cannabis?

This section aims to review the evidence for the hypothesis that the onset of psychosis may precipitate the initiation of cannabis use.

1.2.2.1 The self-medication hypothesis

The theory of self medication (Khantzian, 1985; 1997) is one of the most widely cited theories to account for the relationship between cannabis use and psychosis. The theory postulates that drugs are chosen based on their pharmacological properties, with specific substances used in order to relieve specific affective states associated with psychosis, or to relieve the side effects of anti-psychotic medication (Khantzian, 1985). Therefore according to the theory, substance selection should differ between different diagnoses, with more severe symptoms associated with increased drug use, and specific drugs should be used for the relief of specific symptoms (Mueser et al., 1998).

Despite the appeal of this theory, studies suggest that there is little supportive evidence. Research indicates that substance selection does not differ between diagnoses (Reiger et al., 1990), or between people with and without co-morbid psychosis (Mueser et al., 1990; Ringen et al., 2007). There is also no evidence to support an association between drug choice and specific psychotic symptoms (Dixon, 1999). Furthermore, self-report studies fail to provide evidence that substance use results from an attempt to alleviate specific psychotic symptoms (Test, Wallisch, Allness & Ripp, 1989; Fowler et al., 1998), instead evidence suggests that the reasons for substance use are similar for people with and without co-morbid psychosis (B. Green, Kavanagh & Young, 2004; Schaub, Fanghaenal & Stohler, 2008). Drug use can also have a complex array of effects in schizophrenia and often produces effects inconsistent with the theory of self-medication. Indeed the use of

cannabis has been reported by patients to lead to an exacerbation of positive psychotic symptoms (Baigent, Holme & Hafner, 1995; Addington & Duchak, 1997; Dekker, Linzsen & De Haan, 2009), and there is evidence to suggest that an increase in psychotic symptoms may actually be associated with a decline in the use of cannabis (Fergusson, Horwood & Ridder, 2005). However, one study has found evidence of a bi-directional relationship between cannabis use and psychosis, with a higher frequency of cannabis use associated with increased likelihood of psychotic relapse, and increased psychotic symptom severity found to be predictive of a relapse to cannabis use (Hides, Dawe, Kavanagh & Young, 2006).

Overall, the empirical evidence provides little support for the hypothesis that substance use in psychosis represents an attempt to self medicate specific positive psychotic symptoms or medication side effects (Mueser et al., 1998), although research suggests that substance use in psychosis may be used to alleviate general dysphoria, such as boredom and anxiety (Spencer, Castle & Michie 2002; Dixon, Haas, Welden, Sweeney, & Frances, 1990).

1.2.3 Summary

In summary, evidence suggests that the use of cannabis may increase the risk of developing psychosis, with greater levels of cannabis use during adolescence conferring a greater risk of psychosis onset (Andréassen et al., 1987). Neurobiological evidence suggests that this risk may be especially prominent among adolescents with an existing genetic vulnerability (Caspi et al., 2005). The evidence indicates that the period of adolescence may be particularly sensitive to the effects of cannabis use resulting in an increased risk of later psychosis. It is possible that the use of cannabis during adolescence

interferes with neurological maturational processes resulting in an increased likelihood of developing psychosis. In support of this, there is research to suggest that synaptic plasticity may be impaired in schizophrenia (Keshavan, Anderson & Pettegrew, 1994) and it is proposed that cannabis use in adolescence could alter endogenous cannabinoid-mediated synaptic plasticity, thereby affecting brain maturation (Robbe, Alonso & Manzoni, 2003). Further evidence comes from animal data which suggests that the peripubertal period may be critical for the development of CB1 receptors and endocannabinoid levels (Rodriguez de Fonseca, Ramos, Bonnin & Fernandez-Ruiz, 1993). If cannabis use is a risk factor for the onset of psychosis as the evidence suggests, it is estimated that 14% of psychosis cases would not have occurred in the absence of cannabis use (Moore et al., 2007).

Nevertheless, some authors argue against the viewpoint of cannabis use as a causal factor in the development of psychosis. This is mainly because the prevalence of cannabis use has increased over the last 30 years, without a concurrent increase in the rate of schizophrenia (Frisher, Crome, Martino & Croft, 2009). It is also argued that other potentially confounding variables, such as common antecedent factors of cannabis use and mental health, residual confounding and reverse causation may instead mediate the relationship between cannabis and psychosis (Macleod et al., 2004, Macleod, Smith & Hickman, 2006). It has been proposed that the use of cannabis in psychosis may therefore occur after the onset of psychosis, and the increased prevalence of cannabis use in psychosis may instead be the result of the individual self medicating their psychotic symptoms. However, as already reviewed, there is very little evidence to support the self-medication theory, although it may be that cannabis is more often used to alleviate general dysphoria and negative affective states among people with psychosis.

1.3 The first-episode of psychosis as a 'critical period'

The early stage of psychotic illness is proposed to be important in determining the long-term outcome of psychosis (Addington, 2007; Birchwood, 1999; Birchwood, Todd & Jackson, 1998). Historically psychosis was conceptualised as a progressive degenerative disorder (Kraepelin, 1986) although recent evidence now suggests that deterioration in the level of psychopathology plateaus during the early years of illness. Studies have found most deterioration to occur during the first 2-3 years of illness, with little deterioration thereafter (McGlashen, 1996; Eaton, Thara, Federman, Melton & Liang, 1995). The early stage of illness, or first episode of psychosis, is believed to be formative in biological, psychological and social terms (Wyatt, 1991; Birchwood, McGorry & Jackson, 1997; Birchwood & Macmillan, 1993), and these processes are known to be influential for the course of illness (Birchwood, 1999). Furthermore, it has been suggested that psychosis may be biologically toxic, that is, repeated psychotic episodes become more severe over time, with repeated psychotic episodes and periods of untreated psychosis leading to less complete recovery and increased likelihood of relapse (Wyatt, 1991; Keshavan, 1999). Indeed research indicates that the duration of untreated psychosis (DUP) at the first-episode of illness is a robust predictor of outcome, with longer DUP associated with increased propensity to relapse, increased symptomatology, as well as time to, and length of, psychotic remission (Johnson, Crow, Johnson & Macmillan, 1986; Loebel et al., 1992; Haas, Garratt & Sweeney, 1998).

In light of this evidence, the early stage of psychosis may represent a 'critical period' that is influential for the long- term course of psychotic illness. Intervention during this stage may therefore result in much better long-term outcome compared to intervention during

the later stages of illness. Therefore the identification and understanding of potential prognostic factors during this period may be especially important.

The use of cannabis is highly prevalent among people with psychosis and there is some evidence to suggest that the use of cannabis may be associated with poorer symptomatic outcome. There is also some evidence to suggest substance use may be associated with a longer duration of untreated psychosis (A. I. Green et al., 2004), therefore the investigation of cannabis use during this period may have important implications for our understanding of the progression and long-term outcome of psychotic illness. Investigation of the effects of cannabis use on psychotic symptoms in early stage psychosis also has methodological advantages as it enables control of confounding factors, such as repeated psychotic episodes, that are known to affect outcome in psychosis (Shepherd, Watt, Falloon, & Smeeton, 1989). In other words, the investigation of cannabis use in individuals with established psychoses can often make it difficult to identify the effect of cannabis from other potentially confounding factors that are not present during the first episode of illness.

1.4 Substance use and psychosis

This section reviews the evidence in relation to the effect of substance use on the symptoms of psychosis, with a particular focus on the first-episode of illness.

1.4.1 The effect of substance use in psychosis

There has long been concern regarding the potential adverse effect of substance use in psychosis. There is evidence from cross sectional studies to suggest that substance use in

psychosis may be associated with a younger age of psychosis onset, younger age at first treatment (Fowler et al., 1998; Margolese, Negrete, Tempier, & Gill, 2006), increased rate of hospitalisation (Swofford, Kasckow, Scheller-Gilkey, & Inderbitzin, 1996; Salyers & Mueser, 2001) and poorer treatment and medication compliance (Swofford et al., 1996; DeQuardo, Carpenter, & Tandon, 1994). However, other studies have failed to find any adverse effects, with substance use not found to impact upon the age of psychosis onset (DeQuardo et al., 1994; Cantwell, 2003), the severity of psychotic symptoms (DeQuardo et al., 1994; Zisook et al., 1992; Cantwell, 2003) or the number of hospitalisations (Zisook et al., 1992; Cantwell, 2003; Fowler et al., 1998).

Regarding the long-term effect of substance use in psychosis, a recent 15 year study (Schmidt, Hesse & Lykke, 2011) suggests that substance use may be associated with significantly more hospital admissions and outpatient episodes as well as increased morbidity. However, this study has several limitations; the study relied on case records and so the severity of psychotic symptoms or any changes in substance use over the 15 year period is not known, and participant groups were not matched in terms of age or gender, although attempt was made to control for this during analysis.

Research by Greig and colleagues (2006) overcomes many of these methodological shortcomings and illustrates the importance of measuring the severity of substance use over time. Substance use and psychotic symptoms were assessed for forty-seven psychiatric in-patients with assessment at baseline, six months, twelve months and at approximately 4-6 years. Participants were categorised according to the severity of substance use during the follow-up period. Participants were categorised as either persistent hazardous substance users, intermittent substance users or non-hazardous users.

Hazardous substance use was defined as meeting diagnostic criteria for past 6 month substance abuse or dependence on the Structured Clinical Interview for DSMIII-R (SCID, 1990), the use of any illicit drug on a weekly basis in the previous month, or alcohol use in excess of recommended guidelines (Pols & Hawks, 1992). Participants that reached the hazardous threshold for substance use at baseline, either 6 or 12 month follow-up and the longer term follow-up phase were categorised as persistent hazardous users; intermittent hazardous users were defined as participants reaching the hazardous threshold at baseline and either 6 or 12 month follow-up but not at longer term assessment; non-hazardous users were defined as participants that did not reach the threshold for hazardous substance use at any phase of assessment. Persistent hazardous substance users were found to have increased psychiatric symptomatology and a lower level of symptomatic improvement compared to intermittent hazardous users. Persistent hazardous substance users were also found to have higher levels of social dysfunction compared to non-hazardous substance users.

1.4.2 The effect of substance use in first-episode psychosis

As highlighted in section 1.3, the early phase of psychosis may be important in determining the long-term outcome of psychotic illness. In light of this it is important to understand the effect of substance use during the early phase of illness. Research in first-episode psychosis indicates that substance use may be associated with an earlier onset of psychosis (Addington & Addington, 1998), with an earlier age for the first sign of psychosis, first negative symptom, first positive symptom, and first hospital admission (Hambrecht & Häfner, 1996). Studies also suggest that substance use may be associated with increased positive psychotic symptoms (Mauri et al., 2006) and poorer quality of life

(Addington & Addington, 1998). However, other research has failed to support this, with no association found between substance use and symptomatic outcome or social functioning during the first-episode of psychosis (Van Mastrigt et al., 2004; Addington & Addington, 1998).

Previous longitudinal research has also found inconsistent findings regarding the effect of substance use on symptomatic outcome during the early stage of psychosis. Some studies suggest that in the longer term, substance use during the first-episode of psychosis may be associated with increased positive psychotic symptoms, poorer treatment compliance (Bühler, Hambrecht, Löffler, der Heiden, & Häfner, 2002), poorer functional outcome (Kovasznay et al., 1997) and a three-fold increased risk of relapse (Sorbara, Liraud, Assens, Abalan, & Verdoux, 2003). However, other studies have failed to find any adverse effects of substance use on longer term illness outcome. Sevy et al. (2001) found no significant association between substance use during the first 6 months of psychosis and the age of psychosis onset, the level of psychotic symptoms or the rate of psychotic relapse. Contradictory results have also been found depending on the measures used. Studies have found substance use to be associated with poorer psychotic symptoms as measured by the brief psychiatric rating scale (BPRS), but not when symptoms were assessed using the assessment for negative symptoms (SANS) or the assessment for positive symptoms (SAPS) (Kovasznay et al., 1997; Rabinowitz et al., 1998). The inconsistent findings between studies may therefore result from differences in the methods of assessment, and failure to control for confounding factors, such as anti-psychotic medication compliance (Addington & Addington, 2007) and psychiatric diagnosis, as well as differences in the definition and measurement of substance use between studies. For example, some studies have investigated the effects of lifetime substance use (Kovaszney

et al., 1997) whereas others have examined the effect of current use (Wade et al., 2006b; González-Pinto et al., 2011), studies also differ in their definition of substance use (i.e. substance use, misuse, abuse or dependence) or have not used structured clinical measures to assess substance use (Grech et al., 2005; Schmidt et al., 2011).

Research that has controlled for a range of potentially confounding factors such as gender, age, psychiatric diagnosis, DUP, and medication compliance suggests that substance use may be associated with an increased risk of in-patient readmission and increased relapse of positive symptoms, as well as a shorter time to relapse. These effects were found to be dose-dependent, with increased adverse outcomes at higher levels of substance use (Wade et al., 2006b). A similar study by the same authors (Wade, Harrigan, McGorry, Burgess, & Whelan, 2007) provides further support for a dose-response relationship between substance use and psychosis. Participants were categorised according to the severity of substance use (heavy use, mild use, no use). The severity of substance use was assessed using the Chemical Use, Abuse and Dependence Scale (CUAD, 1992), the distinction between heavy and mild substance use in this study was based upon a median split of CUAD substance use severity score. Heavy substance use was found to be associated with increased positive psychotic symptoms and poorer social functioning at 15 month follow-up compared to participants that had mild substance use or no substance use history. However, the study failed to find any significant effect of cannabis use on psychotic symptoms or social functioning at baseline or 3 month assessment.

Studies that use repeated assessments of both substance use and psychiatric symptoms provide the best evidence regarding the long-term effect of substance use on psychotic outcome, as such studies are able to account for any changes in substance use over time

and can determine how such change impacts upon psychotic symptomatology. Research of this type suggests that the course of substance use may be prognostic for outcome during the early stage of psychosis. Studies that have compared patients that have stopped or never used substances to patients that continue to use, have found continued substance use to be associated with greater positive psychotic symptoms and increased severity of depression (Harrison et al., 2008; Turkington et al., 2009), poorer functional outcome (Turkington et al., 2009) and increased rates of psychotic relapse (Lambert et al., 2005; Turkington et al., 2009). Conversely, the cessation of substance use during the first-episode of psychosis has been found to be associated with significant improvements in outcome, with lower rates of psychotic relapse (Lambert et al., 2005), and a clinical outcome similar to patients with no substance use history (Turkington et al., 2009). The study by Harrison et al. (2008) also illustrates the importance of prospectively examining the impact of the course of substance use on psychosis rather than relying on classifications of lifetime substance use; as already highlighted the study found continued substance use to be associated with increased positive psychotic symptoms, but no significant relationship was found between substance use and the severity of psychotic symptoms when assessed in relation to lifetime substance use.

Overall, research suggests that patients with co-morbid substance use may have a poorer prognosis for illness (Wade et al., 2006b, 2007). However, it is difficult to determine the impact of cannabis use from research that has examined substance use in general. The following section provides an overview of the findings from research that has focused on the effect of cannabis use during the first-episode of psychosis.

1.4.3 The effect of cannabis use in first-episode psychosis

The use of cannabis in first-episode psychosis has been associated with an earlier age of psychosis onset (Veen et al., 2004; Van Mastrigt et al., 2004; Mauri et al., 2006; Barnes, Mutsatsa, Hutton, Watt, & Joyce, 2006; A. I. Green et al., 2004), and increased positive psychotic symptoms (A. I. Green et al., 2004; Cleghorn et al., 1991). However, other cross-sectional research has found no significant effect of cannabis use on positive or negative psychotic symptoms, the number of hospitalisations or the level of functioning (Peralta & Cuesta, 1992).

Prospective research examining the impact of cannabis use on the symptoms of psychosis suggests that the use of cannabis may result in increased positive psychotic symptoms, with this association not confounded by age, gender or age of psychosis onset (Addington & Addington, 2007). Similarly, a follow-up study of 68 months found the use of cannabis to be associated with significantly more hospitalisations, increased thought disturbance and increased hostility (Caspari, 1999). The use of cannabis has also been associated with an increased rate of psychotic relapse as well as a shorter time to relapse, in a dose-response fashion (Linszen, Dingemans & Lenior, 1994); this association remained significant after controlling for confounding factors such as other drug use and compliance with anti-psychotic medication. However, the study failed to find any significant differences in positive psychotic symptoms at baseline between cannabis users and non-users.

In summary, the evidence from these prospective studies suggests that cannabis use may be an independent risk factor for increased positive symptoms, more frequent and earlier relapses, and poorer psycho-social functioning in early stage psychosis. However, these

studies do not account for the course of cannabis use over time, and fail to examine how changes in the use of cannabis may result in changes in psychiatric symptomatology. Grech, Van Os, Jones, Lewis, & Murray (2005) examined the course of cannabis use and the severity of psychotic symptoms over a period of four years. The study found that, compared to participants that stopped using cannabis, participants that continued to use experienced significantly greater positive psychotic symptoms. This association remained significant after controlling for age, sex and ethnicity. Similar findings are reported in a six month follow-up study of children and adolescents with first-episode psychosis; the cessation of cannabis use was associated with significantly lower positive, general and total scores compared to individuals who continued to use cannabis (Baeza et al., 2009). This study also found cannabis use at baseline to be associated with significantly greater positive psychotic symptoms compared to non-cannabis users, although at six month follow-up the reverse was true; cannabis users were found to have significantly less positive psychotic symptoms.

Most recently Gonzáles-Pinto et al. (2011) conducted an eight year follow-up study, measuring the course of both cannabis use and psychotic symptoms using repeated assessments. The study failed to find any significant effect of continued cannabis use on positive psychotic symptoms. Continued cannabis use was however found to impede recovery in negative symptoms and psycho-social functioning. This is in contrast to participants that stopped using cannabis, who were found to experience significant improvements in both negative symptoms and psycho-social functioning over time. The significant differences between participant groups only became apparent after a period of five years, but these results suggest that the continued use of cannabis may be associated with a lower likelihood of psychotic remission.

Overall, research suggests that substance use and cannabis use may be associated with a poorer long-term outcome in psychosis, especially for positive psychotic symptoms and the rate of psychotic relapse (Addington & Addington, 2007; Caspari, 1999). This association appears to be dose-dependent, with heavier use of cannabis associated with more severe psychotic symptoms (Linszen et al., 1994). Research that prospectively assesses the course of cannabis use over time and the impact of a change in cannabis use on psychotic symptoms suggests that continued use may impede recovery in psychotic symptoms, but the cessation of cannabis use may result in improved outcome (Grech et al., 2005; Baeza et al., 2009; Gonzáles-Pinto et al., 2011). However, as highlighted in this review, the findings regarding the impact of cannabis use on the symptoms of psychosis have not been consistent between studies.

1.5 The course of cannabis use among people with psychosis

The previous section indicates that the course of cannabis use may be prognostic for later outcome in psychosis, it is therefore important that we understand the course of cannabis use during the early stage of illness.

The first-episode of psychosis appears to be a period of significant decline in the use of cannabis. Naturalistic studies of substance use in psychosis indicate that the prevalence of cannabis use may reduce by over 50% during the first-episode of illness (Harrison et al., 2008; Turkington et al., 2009), and it appears that the first few years of illness may be the period of most significant change in cannabis use. Addington and Addington (2007) found the greatest declines in cannabis use occurred during the first two years after admission to a specialist service for first-episode psychosis. This is further supported in other research;

one of the most comprehensive studies of the natural course of cannabis use in 90 first-episode psychosis patients assessed the level of substance use over an eight year period following hospital admission for recent onset psychosis (González-Pinto et al., 2011). Drug use information was collected from the patient, a key-informant, medical records and drug screens at baseline, 1, 2, 3, 4, 5 and 8 year assessment. 43.5% of the sample were found to have never used cannabis, 29.3% stopped using cannabis over the 8 year study period and 27.2% continued to use cannabis. The study found that the greatest declines in cannabis use occurred during the first few years of illness, with 85.2% of participants that stopped using cannabis doing so during the first 3 years after entry to treatment.

Interestingly research indicates that a significant amount of change in cannabis use may actually occur prior to involvement with specialist psychiatric services, but following the onset of psychosis and first contact with mental health professionals (Decker et al., 2008). It may be that the experience of psychosis causes some patients to reassess their substance use behaviour, and the onset of psychosis may precipitate the cessation of substance use, at least for a number of patients. This is in contrast to the rate of substance use among individuals with more established psychoses which appears to be relatively stable (Margolese et al., 2006).

However, despite the significant reductions in substance use during this stage of illness, research suggests that a large proportion of patients may continue to use substances; for example, a large-scale study of 786 first-episode psychosis patients found that 34.5% of patients had no substance use at entry to treatment, 39.4% of patients decreased or ceased substance use, but 26.1% of patients continued to use (Lambert et al., 2005). Similar findings are also reported in other first-episode studies (González-Pinto et al., 2011).

Given the potential for substance use to affect the symptomatic outcome of psychosis, it is important to understand the reasons why people with psychosis continue to use or stop the use of cannabis.

Several studies have now examined the course of cannabis use during the first-episode of psychosis (Harrison et al., 2008; Turkington et al., 2009), although only one study has assessed changes in the frequency and quantity of substance use (Wade et al., 2006b). One-hundred and three patients with FEP were followed-up over a period of 15 months; of the total patient sample 27.2% were found to have no substance use, and 19.4% of patients stopped substance use during the follow-up period, however 51.5% of patients continued to use and 1.9% were found to commence substance use. The study found that participants that continued to use experienced significant reductions in the frequency of use and the level of substance dependence over the 15 month period (Wade et al., 2006b).

The evidence reviewed so far suggests that the use of cannabis increases the risk of psychosis when used in adolescence (Arseneault et al., 2002), and may be associated with a poorer outcome in psychosis, but there may however, be an improvement in outcome after the cessation of cannabis (Grech et al., 2005; Gonzáles-Pinto et al., 2011). Therefore, it is important to understand the factors that are associated with the initiation, continued use and cessation of cannabis during the first-episode of psychosis.

1.6 Summary and conclusions

In summary, the evidence suggests that the use of cannabis is highly prevalent among people with psychosis (Reiger et al., 1990), and there is data to indicate that the use of

cannabis during adolescence may increase the risk of developing psychosis (Arseneault et al., 2002; Caspi et al., 2005).

However, the evidence regarding the effect of cannabis use in psychosis is inconsistent, with some studies suggestive of poorer symptomatic outcome (Cleghorn et al., 1991; Caspari, 1999), whilst other studies have failed to find any significant adverse effects of cannabis use (Peralta & Cuesta, 1992). It is clear that further research is required in order to explore the long-term effect of cannabis use in psychosis, especially during the early stage of illness. Ideally this research would examine the course of cannabis use over time as this may be prognostic of later outcome. As the early phase of first-episode psychosis appears to be a period of significant change in substance use, research will need to examine the early stage of FEP as this may maximise the potential of identifying a) why individuals continue or cease their use of cannabis and b) how a change in cannabis use impacts the early course of psychotic symptomatology. Research should also aim to measure change in a range of variables related to the use of cannabis, such as the frequency and quantity of cannabis use, rather than relying on binary categorical classifications of use or non-use. The above methodological suggestions would help to provide more detailed information regarding the relationship between cannabis use and psychosis.

It is also important that we understand the factors that may influence the continued use of cannabis, as well as the factors that may influence the cessation of cannabis use among young people experiencing their first psychotic episode. Having reviewed the prevalence of cannabis use in psychosis, the causal links between cannabis use and psychosis, and the effect of substance use in psychosis, the following chapter aims to provide a review of the

evidence regarding the factors that may influence the use of cannabis among people with psychosis.

CHAPTER 2

THE MOTIVATIONAL AND SOCIAL FACTORS OF CANNABIS USE

2.0 Overview

This chapter provides an overview of the research literature regarding the factors that may influence the use of cannabis for young people with psychosis. The chapter reviews the factors that the individual perceives to be influential in their use of cannabis (i.e. the motives for use), as well as factors in the individual's social environment that may influence the use of cannabis, such as the level of perceived social status in relation to others, and the structure and relationships within the individual's social network.

2.1 Motives for cannabis use

This section provides an overview of the literature regarding the motives for cannabis use. Motives for cannabis use are defined here as consisting of two different components, namely cannabis expectancy and reasons for cannabis use. Cannabis expectancy is defined as the beliefs an individual has regarding the effect of cannabis and is not dependent on experience of cannabis use, reasons for use are defined as the explicit motivations an individual has for using cannabis and are dependent on experience of using cannabis. Reasons for use and expectancy are proposed to be aetiological factors in the development of substance use (Cox & Klinger, 1988; Cooper, Russell, Skinner, Frone & Mudar, 1992; Stacey, 1995; Newcomb, Chou, Bentler & Huba, 1988), although reasons for use are

generally considered to be more proximate to substance use behaviour (Cooper, 1994). Understanding the motives for cannabis use may provide insight into the perceived functions of cannabis use, and could be important in helping to understand the context and circumstances that are predictive of cannabis use. This information may be important for the development of targeted interventions for substance use in psychosis. Indeed it is posited that motives for use "represent the final common pathway to cannabis use and to the clinician they represent a starting point for assessment and tailoring treatment" (Spencer, 2004, pp.167).

There are only a limited number of studies that have examined motives specific to cannabis use, as the majority of research has focused on motives for general drug use. However, research suggests that motives for use are substance specific (Mueser, Nishith, Tracy, DeGirolamo & Mollnaro, 1995; Spencer et al., 2002; Simons, Correia & Carey, 2000; Aarons, Brown, Stice & Coe, 2001) and so this review only includes studies that have examined motives specifically related to the use of cannabis.

In order to fully understand if motives for the use of cannabis are different among people with psychosis, it is useful to also examine the motives for cannabis use in the general population. Examination and comparison of motives between the two populations may highlight if cannabis use among people with psychosis is significantly motivated by mental health related factors, or for otherwise 'normal' reasons typical of their peer group. For this reason specific attention is paid to matched-design studies that have directly compared people with and without psychosis for reasons and expectancy of cannabis use.

2.1.1 Reasons for cannabis use in the general population

Research in the general population indicates that mood enhancement, coping, social, conformity and expansion (perceptual and cognitive enhancement) motives are the most common reasons for cannabis use (Simons et al., 2000). Most research has examined motives for cannabis use using a set of pre-determined motives, largely adapted from the alcohol research literature. Nevertheless the validity of these motives has been confirmed in research using self-generated responses of the reasons for use (Lee, Neighbors & Woods, 2007).

Reasons for cannabis use in the general population have been found to be predictive of the level of recent use (Zvolensky et al., 2007; Chabrol, Ducongé, Casas, Roura, & Carey, 2005), with coping, mood enhancement, social and expansion motives found to predict past 30 day cannabis use, even after controlling for potentially confounding factors such as cannabis use duration, alcohol and tobacco use (Bonn-Miller, Zvolensky & Bernstein, 2007). Studies also suggest that the use of cannabis for enjoyment, habit, mood enhancement and altered perception may be associated with heavier cannabis use and increased cannabis related problems, whereas experimentation related reasons may be associated with fewer problems (Lee et al., 2007). In addition research that has examined reasons for use and the level of psychopathology suggests that the use of cannabis may not be linked to the self-medication of depression or anxiety in the general population (Chabrol et al., 2005).

2.1.2 Reasons for cannabis use in psychosis

One of the most prominent theories proposed to account for the use of drugs by people with psychosis is the theory of self-medication (Khantzian, 1985; 1997). This theory proposes that specific substances are used to alleviate specific symptoms of psychosis. However, although this theory is intuitively appealing, it has received little empirical support (see Mueser et al., 1998 for a review), and self-report studies instead suggest that cannabis use in psychosis is rarely motivated by mental health related reasons for use; this evidence is reviewed below.

Addington and Duchak (1997) investigated the reasons for cannabis use in 21 outpatients with schizophrenia and found intoxication, to increase pleasure, relaxation, the alleviation of depression and to go along with the group to be the most salient reasons for cannabis use. Similar findings have been reported by Schofield et al. (2006), with boredom, relaxation, social motives, improving sleep and the alleviation of anxiety most commonly cited as reasons for the use of cannabis. In contrast, psychotic related reasons and the side effects of medication were cited by only a minority of patients in these studies. The validity of these findings are further confirmed in a systematic review of the literature regarding the reasons for cannabis use in psychosis (Dekker et al., 2009). This paper reviewed all studies published between 1985 and 2008 for the reasons for cannabis use among patients with psychosis. A total of 14 studies were identified, none of which had been conducted within the UK. The paper concluded that despite the heterogeneity of patient samples and the different methodology between studies, the reasons for cannabis use among psychiatric patient samples were broadly similar. Patients commonly reported relief of dysphoria, social reasons and the enhancement of positive affect as the main

reasons for cannabis use, whereas the use of cannabis for the relief of psychotic symptoms or medication side effects was much less commonly reported.

The investigation of reasons for cannabis use in psychosis has been limited by a lack of standardised scales that include items related to mental health reasons for use. Spencer et al. (2002) have attempted to address this by developing a standardised 34 item measurement scale that includes 17 mental health related reasons for use. To date, this scale has not been used to assess reasons specific to the use of cannabis, although the scale has been used to assess reasons for substance use among people with psychosis (Spencer et al., 2002). This study found the enhancement of positive affect, social motives and coping with unpleasant affect to be the most commonly cited reasons for substance use among people with psychosis, whereas conformity and mental health factors were only infrequently reported as reasons for substance use.

2.1.3 Reasons for cannabis use; matched- design studies of people with and without psychosis

The available evidence suggests that the reasons for cannabis use may be similar for people with and without psychosis (Dekker et al., 2009); however, the most conclusive evidence for this comes from matched-design studies which directly compare the two populations.

Only three published studies have directly compared the reasons for cannabis use in people with and without co-occurring psychosis. Green, Kavanagh & Young (2004) compared men with and without co-occurring psychosis at baseline and again at four weeks. The

study found that the reasons for cannabis use were broadly similar between the two groups. Positive mood alteration, coping with negative affect and social activity reasons were most commonly reported among people with psychosis; for participants without psychosis cannabis was most often used for relaxation and social activity reasons. The only significant differences between participant groups were that people with psychosis were more likely to use cannabis for the alleviation of anxiety, depression or boredom and less likely to use cannabis for relaxation, social activity reasons or because of habit.

Schaub et al. (2008) compared reasons for cannabis use in outpatients with schizophrenia to a matched healthy control group. The study found that participants with psychosis used cannabis more often for boredom related reasons, but this was the only significant difference between participant groups. The most commonly reported reasons for cannabis use among people with and without psychosis were relaxation, to get high, to increase pleasure and to improve sleep.

Only one study has used a matched-group design to examine the reasons for cannabis use during the first-episode of psychosis (Pencer & Addington, 2008). The study found no significant differences between participant groups in terms of the reasons for cannabis use; instead participants with and without psychosis most commonly reported cannabis use for intoxication, to increase pleasure, and to relax. The self-medication of positive psychotic symptoms was not found to be a salient reason for cannabis use for participants with psychosis, although 39% of participants cited the use of cannabis to alleviate depression, 31% reported using cannabis 'to give one more thoughts' and 27% reported using cannabis in order 'to feel more emotions'. The study concluded that there was no evidence for the self-medication of positive psychotic symptoms, although cannabis may be used to self-

medicate secondary morbidity, such as affective, cognitive and social impairments associated with psychosis.

These studies add to the body of literature to suggest that the reasons for cannabis use may be similar for people with and without psychosis. It appears that there is little support for the self-medication of psychotic symptoms, although the findings from matched-design studies suggest that cannabis may be more often used for the alleviation of dysphoria among people with psychosis (B. Green et al., 2004; Pencer & Addington, 2008). However, there has been no empirical study of the reasons for cannabis use in a UK population sample using a matched-control design, and data is also lacking for the early phase of psychosis.

2.1.4 Cannabis use expectancy in the general population

Cannabis expectancy refers to the beliefs an individual has regarding the effects of cannabis, expectancy is not dependent on actual direct experience of use, and can therefore be assessed in people who have never used cannabis. Thus the examination of cannabis expectancy may highlight the factors that are associated with non-use of cannabis. Different cannabis expectancies have been associated with cannabis use, cessation and abstention (Aarons et al., 2001), as well as the frequency and intensity of use (Schafer & Brown, 1991; Buckner & Schmidt, 2008; Gaher & Simons, 2007). Expectancy has also been found to be predictive of future cannabis use (Chabrol et al., 2006) and may relate to future intentions to use, with research indicating that changes in expectancy may result in changes in intentions to use cannabis (Skenderian, Siegel, Crano, Alvaro, & Lac, 2008).

This suggests that expectancy challenge paradigms may be efficacious in the treatment of cannabis use.

Research indicates that greater negative cannabis expectancy is associated with non-use of cannabis (Schafer & Brown, 1991; Simon & Aarens, 2007; Aarons et al., 2001) and the cessation of cannabis use (Aarons et al., 2001), whereas people that continue to use cannabis have been found to report greater positive and less negative cannabis expectancy (Aarons et al., 2001; Simon & Aarens, 2007). Similar findings have also been reported in clinical samples of cannabis users seeking drug treatment (Galen & Henderson, 1999).

2.1.5 Cannabis use expectancy in psychosis

The data for cannabis expectancy in psychosis is limited; only two studies have examined cannabis expectancy in this population.

Mueser et al. (1995) conducted the first investigation of cannabis expectancy among people with psychosis, comparing patients with no drug use, past drug use, and recent drug use. The study found patients with recent or past substance use to have significantly different expectancies for cannabis compared to patients with no history of use. The study also found coping and enhancement expectancy motives to be more strongly associated with drug-related problems.

Other research in psychosis has found cannabis expectancy to be associated with the frequency of cannabis use. Expectancy of social facilitation and cannabis use as a habit has been found to be associated with recent cannabis use, and the expectancy of cannabis use

as a habit has also been associated with the severity of cannabis dependence (Hides, Kavangh, Dawe & Young, 2009). The study found no significant association between psychotic symptoms, cannabis expectancy or the severity of cannabis use, leading the authors to conclude that cannabis use was not related to the self-medication of psychotic symptoms. However, this study used the cannabis expectancy profile, a relatively new measure that requires further psychometric validation for use among people with psychosis.

2.1.6 Cannabis use expectancy; matched design studies of people with and without psychosis

Only two studies have directly compared people with and without psychosis for cannabis expectancy. Green, Kavanagh & Young (2007) assessed cannabis expectancy in men with and without psychosis and found no significant differences between the two populations. However, cannabis expectancy in this study was assessed by providing participants with photographic representations of cannabis being consumed, and then asking participants to rate the outcome of their most recent occasion of cannabis use using visual analogue scales. It could therefore be argued that this study assesses the subjective effects of recent cannabis use rather than cannabis use expectancy.

A more recent study used implicit and explicit assessment of relaxed (positive-sedation), arousal (positive- arousal) and negative cannabis expectancy among people with and without recent-onset psychosis (Dekker et al., 2010). No significant differences were found for implicit expectancy of cannabis use, although people with psychosis were found to have significantly greater explicit negative cannabis expectancy. However, the study

used the implicit association test and visual analogue scales developed by the study authors to assess cannabis expectancy, and the use of non-standardised methods of assessment makes it difficult to interpret the findings.

These studies provide some preliminary evidence to suggest that cannabis expectancy may be similar for people with and without psychosis. However, these studies failed to use standardised measures of assessment, and this methodological shortcoming makes it difficult to interpret the findings. Only one study (Gonzalez, Bradizza, Vincent, Stasiewicz, & Paas, 2007) has used standardised measures of expectancy in a matched-control design. However, this study is not specific to the use of cannabis, but rather substance use in general. Nevertheless, the results of this study suggest that substance use expectancy may be similar for people with and without psychosis.

2.1.7 Summary

Investigation of the reasons for cannabis use and expectancy of cannabis may highlight the factors that maintain the use of cannabis among people with psychosis. The investigation of cannabis use expectancy among people who have stopped or never used cannabis may also highlight the factors associated with cannabis cessation and abstention. However, there is a lack of data regarding cannabis expectancy in psychosis, especially for studies that have used standardised and validated measures of assessment.

Despite the heterogeneous methods of assessment for cannabis use motives, the available evidence suggests that reasons and expectancy for the use of cannabis may be similar for people with and without psychosis. The literature suggests that the main motives for the

use of cannabis among people with psychosis are to increase positive affect, reduce negative affect and for social related reasons; in contrast the use of cannabis for psychosis specific reasons (i.e. to alleviate positive psychotic symptoms) appear to be infrequently reported (Dekker et al., 2009). These motives for use are similar to those reported in the general population; namely, mood enhancement, coping and social related motives (Simons et al., 2000). However, there is a lack of research that has used a matched-design to explore the motives for cannabis use, particularly in UK patient samples and for patients in the early stage of psychosis.

2.2 Socio-environmental factors and cannabis use

A significant amount of the available research has focused on individual factors for cannabis use, such as motives for use, and whilst this is undoubtedly important it is also crucial to consider the social context of cannabis use and the impact of the social environment on cannabis use behaviour. The following section aims to highlight the socio-environmental factors that may be associated with the use of cannabis in psychosis. It has been argued that "aspects of both social competence and social networks are central to understanding addictive behaviour" (Drake, Brunette & Mueser, 1998, pp. 280), and as highlighted by the research on motives for use, social factors have been found to be influential in the use of cannabis for people with psychosis (Dekker et al., 2009). Therefore it is important to understand how a person's social network may relate to the use of cannabis. Research has consistently shown an association between the social network and substance use, and there is some evidence to suggest that the social networks of people with psychosis may be smaller than the social networks of people without psychosis (Macdonald, Hayes & Baglioni, 2000). There is also data to indicate that among people

with psychosis, the social network may differ according to the use or non-use of drugs, with substance using patients found to have larger social networks (Salyers & Mueser, 2001). Equally how a person relates to people within their social network may also be associated with cannabis use in psychosis. The process of social comparison is fundamental for social interaction, and data relating to this is presented.

2.2.1 Social networks and the use of cannabis

This section provides an overview of the literature regarding the relationship between social networks and substance use in the general population and people with psychosis.

2.2.1.1 Social networks and the use of cannabis in the general population

There is evidence to suggest that the social network is influential in the initiation and maintenance of cannabis use and may facilitate and reinforce cannabis use behaviour. The peer group may contribute to the initiation of cannabis use in a number of ways; social groups often share a common set of values, beliefs and social norms; the peer group may positively reinforce drug use behaviour and may also provide opportunities for drug use (Oetting & Beauvis, 1986).

Research has found the number of peers that use cannabis to be a significant predictor of the initiation and maintenance of individual cannabis use (Chabrol et al., 2006; Kuntsche & Jordan, 2006; Kosterman et al., 2000), and peer cannabis use has been associated with as much as a two to three-fold increase in the risk of individual cannabis use (Coffey, Lynskey, Wolfe & Patton, 2000; Guxens, Nebot & Ariza, 2007). Research also suggests

that belonging to a peer group in which there are favourable attitudes towards the use of cannabis may be associated with a 1.6 increased odds ratio of cannabis initiation (Agrawal, Lynskey, Bucholz, Madden & Heath, 2007). Peer drug use has been found to be influential for the frequency of individual cannabis use (von Sydow, Lieb, Pfister, Höfler, & Wittchen, 2002), and the amount of time spent with drug using friends has been found to predict lifetime use of cannabis, as well as the frequency of cannabis use in adolescence (Best et al., 2005). Conversely, research indicates that the number of peers opposed to cannabis use may be influential in preventing the use of cannabis (Chabrol et al., 2006).

Peer influence may therefore represent a key factor in the aetiology of cannabis use, and yet despite this, research has failed to systematically examine the structure of the social network in relation to cannabis use. The only available evidence is in relation to the social network and the use of alcohol. Evidence indicates that greater alcohol specific support among social network members (Longbaugh, Wirtz, Zywiak & O'Malley, 2010), an increased number of alcohol abstainers (Zywiak, Longbaugh & Wirtz, 2002) and larger social networks (Zywiak, Neighbors, Martin, Johnson, Eaton & Rohsenow, 2009) may be associated with improved outcomes for alcohol use. Evidence also suggests that the addition of just one alcohol abstinent person to the social network may increase the likelihood of abstinence by 27% (Litt, Kadden, Kabela-Cormier & Petry, 2007), whereas the inclusion of drinkers in the social network has been found to increase the risk of alcohol relapse (Havassy, Hall & Wasserman, 1991; Mohr et al., 2001). In light of this evidence it has been suggested that social network variables should be routinely assessed in order to enhance treatment planning (Longbaugh et al., 2010).

2.2.1.2 Social networks and the use of cannabis in psychosis

Social networks are likely to be equally, if not more important for drug use among people with psychosis. Social isolation is proposed to be an aetiological factor for the development of substance use among people with psychosis, as substance use may offer a pathway to a social group (Drake, Wallach, Alverson & Mueser, 2002). It is also suggested that the use of cannabis may be an important way for people with psychosis to maintain social contacts (Schofield et al., 2006), and several studies have found social related motives to be highly salient for cannabis use among people with psychosis (Schaub et al., 2008; Dekker et al., 2009). It is also argued that people with psychosis may lack the support to resist using substances that would ordinarily be provided by family, employment and friends (Mueser et al., 1992).

Research suggests that the social networks of people with psychosis may be significantly different to the social networks of people without psychosis. Research indicates that people with psychosis may have a smaller social network with fewer friends, fewer people to provide support in a crisis and a greater proportion of service users as social network members (Macdonald et al., 2000). In fact the onset of psychosis has been termed a 'network crisis' (Beels, 1979). Research suggests that there may be a loss of social contact following the onset of psychosis (Macdonald, Sauer, Howie & Albiston, 2005), and it appears that a longer duration of illness may be associated with an increased loss of social contacts. Research indicates that patients with multi-episode or chronic psychosis may have smaller social networks in comparison to first-episode psychosis patients (Lipton, Cohen, Fischer & Katz, 1981). The duration of illness may also impact the composition of the social network, with an increase in the proportion of patients in the social network with a longer duration of illness (Albert, Becker, McCrone, & Thornicroft, 1998).

Although research has compared the social networks of people with and without psychosis, substance use has not been examined in relation to this. There has been no comparison of the social networks of substance users with and without co-occurring psychosis, although there is some data to suggest that the level of psychopathology among substance users may be inversely related to the size of the social network (Westermeyer & Neider, 1988). It also appears that there may be differences between substance using and non-substance using patients with psychosis. Research suggests that substance using patients may have a greater level of social functioning and larger social networks compared to non-substance using patients (Salyers & Mueser, 2001; Drake et al., 1998).

It is acknowledged that "little is known about the potentially complex role of social networks in the course and treatment of co-morbid substance abuse and severe mental illness" (Trumbetta, Mueser, Quimby, Bebout & Teague, 1999, pp. 408). Although in line with findings from the general population research suggests that patients with fewer drug using contacts in the social network have a better long term outcome for substance use (Trumbetta et al., 1999). In light of this, social network approaches designed to restructure social support networks (Bebout, 1993), and social network interventions for substance use (Galanter et al., 2004; Copello, Orford, Hodgson, Tober, & Barrett, 2002) may be beneficial when used within mental health populations. Firstly however, a greater understanding is required regarding the role of social networks in the use of cannabis among people with psychosis. Specifically, data is lacking regarding comparison of the social networks of substance using and non-substance using patients, particularly around the onset of illness, and research is needed that compares the social networks of substance users with and without co-occurring psychosis.

2.2.2 Social status, cannabis use and psychosis

In addition to understanding how composition of the social network and members of the social network may support the continued use of cannabis and cannabis abstention, it is also important to consider the relationship processes in more depth, as how people relate to others within their social network may also be important. Social comparison refers to a process of evaluating attitudes, abilities and beliefs in comparison to others. "Social comparison is an inevitable part of any social environment" (Swallow & Kuiper, 1988, pp. 59), is fundamental for social interaction and social relationships, and is thought to involve judgements of social rank, attractiveness and group fit (Allen & Gilbert, 1995).

Research suggests that there is an inverse relationship between social comparison and psychopathology (Furnham & Brewin, 1988; O'Connor, Berry, Weiss & Gilbert, 2002; Gilbert & Allan, 1998; Allan & Gilbert, 1995; Swallow & Kuiper, 1988). There is considerable evidence to suggest that people with depression have greater levels of social defeat (Gilbert & Allan, 1998) and make social comparisons of lower rank and inferiority in comparison to others (Swallow & Kuiper, 1988; Allan & Gilbert, 1995; Gilbert, Allan & Trent, 1995). Indeed, dysfunctional social comparison is proposed as a potential mechanism for the difficulties in social interaction and social withdrawal among people with depression (Swallow & Kuiper, 1988). This assertion is supported by findings from animal studies which have shown social rank to be associated with social avoidance (Blanchard & Blanchard, 1990).

It is proposed that a loss of social affiliation, marginalisation, and loss of support may lead to an individual making unfavourable social comparisons (Allan & Gilbert, 1995). These changes are likely to be characteristic of depression, but may also be relevant to people

experiencing psychosis. There is some research to suggest that negative social comparison may be linked to psychosis; studies have found higher levels of psychopathology to be associated with negative social comparison (Allan & Gilbert, 1995), and research in psychosis indicates that perceived differences in social rank between self and others may relate to the level of subordination in response to auditory hallucinations (Birchwood, Meaden, Trower, Gilbert & Plaistow, 2000; Birchwood et al., 2004).

Furthermore long-term, chronic exposure to perceived social defeat and social marginalisation has been proposed as a risk factor for the development of psychosis, as prolonged social defeat may lead to sensitisation of the mesolimbic dopamine system (Seltern & Cantor-Graae, 2005; 2007). Social defeat has also been posited as a risk factor for the development of drug use (Seltern & Cantor-Graae, 2005), this hypothesis is derived from animal studies that have shown repeated experiences of social defeat to lead to behavioural sensitisation in which the animal displays an enhanced behavioural response to dopamine agonists (Covington & Miczek, 2001). Further support is provided by animal studies that have shown socially defeated monkeys to consume greater amounts of cocaine (Morgan et al., 2002), and research has shown the administration of amphetamine to increase the level of subordination in socially defeated monkeys (Harber, Barchas & Barchas, 1981).

In summary, the perception of lower social status in comparison to others may be associated with an increased likelihood of social withdrawal and social avoidance. This may then impact upon the relationships the individual has within their social network. In this context, individuals may be more likely to be attracted to cannabis use in view of the opportunities it provides for social contact. There is some evidence to suggest a link

between social comparison, psychosis and substance use and yet it is not known if patients with co-occurring substance use differ in their perceived social status compared to non-substance using patients, and it is also unclear if there are differences in perceived social status between substance users with and without psychosis.

2.3 Psycho-social interventions for substance use in psychosis

Cognitive behavioural therapy (CBT) and motivational interviewing (MI) are the most common psychosocial interventions for substance use, and are based upon the motives for substance use. In the general population CBT has been found to be effective at reducing the frequency of cannabis use, cannabis dependence and cannabis related problems compared to a delayed treatment control group (Copeland, Swift, Roffman & Stephens 2001; Stephens, Roffman, & Curtin, 2000). Indeed a meta-analytic review concluded that CBT interventions are associated with consistently significant and clinically meaningful reductions in adolescent substance use (Waldron & Kaminer, 2004). Studies also indicate that motivational interviewing is effective in reducing the use of cannabis, with interventions of longer duration associated with improved outcomes (Jungerman, Andreoni & Laranjeira, 2007).

In contrast, the outcomes for psychosocial interventions for substance use in mental health populations have been poor. CBT for cannabis use during the first-episode of psychosis has failed to demonstrate superior outcomes compared to less intensive psycho-educational approaches (Edwards et al., 2006), and interventions that have combined the use of CBT and MI have also failed to result in improved outcome, with no significant differences in the number of days abstinent from substance use compared to routine care (Haddock et al.,

2003). Furthermore, a review of the literature for substance use interventions for this population found little evidence for any definitive difference between psychosocial interventions and treatment as usual, with no evidence to favour one psychosocial approach over another (Cleary, Hunt, Malheson, Siegfried & Walter, 2008). However, some studies have found cognitive based approaches to be successful; there is evidence to suggest improved outcome for brief motivational interviewing compared to standard care (Kavanagh et al., 2004). CBT combined with MI and family therapy has been associated with a significantly greater number of days abstinent from substance use compared to routine care (Barrowclough et al., 2001), and in one of the largest RCTs to date CBT was found to be associated with reduced quantity of substance use, with these effects maintained at two year follow-up (Barrowclough et al., 2010).

In summary, review of the evidence suggests that cognitive interventions for substance use, such as cognitive behavioural therapy (CBT) and motivational interviewing (MI) may be less efficacious for people with psychosis compared to the general population, although the reason for this is unclear. In order to improve interventions for substance use among people with psychosis further research is required comparing the factors associated with substance use among people with and without psychosis.

2.4 Summary and conclusions

The available literature suggests that the self-medication of psychotic symptoms or medication side effects may not be a primary motive for cannabis use among people with psychosis; instead the motives for use appear to be remarkably similar to motives for the use of cannabis among the general population (B. Green et al., 2004; Schaub et al., 2008;

Pencer & Addington, 2008). Nevertheless, there is a lack of empirical research that has directly compared the two populations, especially during the first-episode of psychosis, and differences in the methodology and the definition of substance use makes it difficult to compare the results of studies that have separately examined the two populations. Investigation of cannabis use expectancy among people who continue to use, have stopped using cannabis or have never used cannabis may also highlight the factors influential for the use of cannabis, cannabis cessation and abstention in psychosis. At present there is very little empirical data in relation to this.

There is evidence to suggest that types of social networks and the presence of certain peer groups are associated with substance use, and research suggests that there may be differences in the social networks of substance using and non-substance using patients (Salyers & Mueser, 2001; Drake et al., 1998), as well as differences in the networks of substance users according to the level of psychopathology (Westermeyer & Neider, 1988). Further research is needed to examine this, and may highlight the influence of the social network in cannabis use behaviour among people with first-episode psychosis. The limited data available regarding social status suggests that there may be a link between perceived social status, substance use and psychosis (Seltern & Cantor-Graae, 2005). At present however, no study has empirically investigated this potential relationship.

The following chapter outlines the aims and rationale for the current programme of research.

CHAPTER 3

THESIS AIMS AND RATIONALE

The present programme of research has several key aims; firstly to examine the longer-term impact of cannabis use and change in use on the symptoms of psychosis among young people experiencing their first psychotic episode, and secondly, to explore the motivational and social factors of cannabis use and cannabis use change for this population. As part of this, the research will explore the extent to which reasons for cannabis use among people with psychosis are similar to reasons for cannabis use among people without psychosis.

As discussed in chapter 1, previous research that has assessed the impact of cannabis use on the symptoms of psychosis has had several methodological shortcomings, which may in part explain the inconsistent findings regarding the impact of cannabis use on symptomatic outcome (Cleghorn et al., 1991; Peralta & Cuesta, 1992). Several studies have examined the impact of cannabis use on the symptoms of psychosis during the early stage of psychotic illness (Caspari, 1999; Linszen et al., 1994). However, although these studies were prospective in design they failed to account for any change in the use of cannabis over time (i.e. whether a person continues to use, stops using or has never used cannabis), and most studies have instead analysed data according to cannabis use / no use criteria. As discussed in chapter 1, the early stage of psychosis is characterised as a period of significant change in substance use (Harrison et al., 2008; Turkington et al., 2009). Research also indicates that the course of cannabis use may be prognostic for later

outcome in psychosis, with continued cannabis use found to impede recovery in psychotic symptoms, whereas the cessation of cannabis use has been associated with significant symptomatic improvement (Grech et al., 2005; Gonzáles-Pinto et al., 2011). Therefore in order to fully understand the impact of cannabis use on the early course of psychotic symptoms, it is important that research accounts for any change in the use of cannabis over time and examines how a change in cannabis use may impact the early course of psychotic symptomatology.

Furthermore, as research suggests that the course of cannabis use may be prognostic for outcome in psychosis it is also important that we understand the course of cannabis use during the early phase of illness. It appears that the onset of psychosis may precipitate the cessation of cannabis use for many patients (Dekker et al., 2008) and the first-episode of illness appears to be a period of significant decline in substance use (Harrison et al., 2008; Turkington et al., 2009). Only one study has examined change in other indices of cannabis use such as the frequency of cannabis use over time (Wade et al., 2006a). In order to increase our understanding of the course of cannabis use during the first-episode of psychosis research needs to examine change in a range of cannabis use variables, such as the frequency and quantity of use, and the level of cannabis dependence.

This research aims to further examine the impact of cannabis use on the symptoms of psychosis during the early stage of illness, addressing these limitations and gaps in previous research. The research in this thesis will prospectively examine the course of cannabis use (i.e. continued use, ceased use or never used), on the symptoms of psychosis. This is examined in chapters 4 and 5. The course of cannabis use, that is, any change in the

level of cannabis use (frequency or quantity of use), cannabis dependence and the level of cannabis related problems during the early phase of psychosis is explored in chapter 7.

As there is evidence to suggest that the course of cannabis use impacts the longer-term outcome of psychosis during the early stage of psychosis (Gonzáles-Pinto et al., 2011), it is important to understand the factors that are associated with the use of cannabis, cannabis cessation and cannabis abstention. With intervention in mind, it is of interest to understand whether these motivational factors are specific to psychosis or representative of the broader population of young people using cannabis.

Evidence indicates that the symptoms of psychosis may not be a primary reason for cannabis use among people with psychosis (Addington & Duchak, 1997; Schofield et al., 2006; Dekker et al., 2009). However, the investigation of reasons for cannabis use in this population has been limited by a lack of standardised measures that include items related to mental health reasons for use. To date, only one study has used a standardised measure of this type, but the study examined general substance use and was not specific to the use of cannabis (Spencer et al., 2002). Investigation of the motives for cannabis use, and the extent they might represent psychosis specific reasons vs. 'normal' motivational factors, has also been hampered by a lack of matched-design studies, especially for the first-episode of psychosis. Indeed, in terms of matched-design studies there has been no empirical investigation of reasons for cannabis use within a UK patient population, and only one study has examined reasons for use during the early stage of psychotic illness (Pencer & Addington, 2008). Furthermore, there is only very limited data regarding cannabis expectancy among people with psychosis, and the available data is often derived from non-standardised measures of assessment, making it difficult to interpret the findings

or to compare the findings to research in the general population (Hides et al., 2009; Green et al., 2007).

In addition to the individual factors that are influential for cannabis use (i.e. motives), there is a wealth of research to suggest that the social context of use and the social environment are implicated in the use of cannabis. Research has highlighted that an individual's social group affects the use (Coffey et al., 2000) and non-use of cannabis (Chabrol et al., 2006). There is also some evidence to suggest that the processes involved in social interaction, such as perceived social status, may also be associated with the use of cannabis (Seltern & Cantor-Graae, 2005), in other words individuals with low perceived social status may be more likely to use cannabis to promote in-group identification and belonging. In light of this it is important that we understand how the social environment (i.e. the individual's social network and how the individual relates to their social network) may be associated with cannabis use behaviour among people with psychosis. At present there is some evidence to suggest that substance using patients with psychosis may have a larger social network compared to non-substance using patients (Salyers & Mueser, 2001). There is also data to suggest that the size of the social network may be inversely related to the level of psychopathology among substance users (Westermeyer & Neider, 1988), however there has been no direct comparison of the social networks of substance users with and without psychosis.

The current research aimed to explore how individual factors for cannabis use, such as the reasons for cannabis use and cannabis expectancy; factors related to the social network, such as network size and composition, and the level of perceived social status, may relate to cannabis use behaviour during the early stage of psychosis. The research sought to

examine this in two ways, firstly by comparing young people with first-episode psychosis who were either i) using cannabis, ii) had stopped using cannabis or iii) had never used cannabis, as it was expected that this analysis would highlight the factors that are associated with cannabis use, cessation and abstention in this group; and secondly, by comparing young people with psychosis who were using cannabis to a matched-control group of young people using cannabis who did not have psychosis. It was expected that this analysis would highlight if the factors that influence the use of cannabis among people with psychosis are different to factors for use among the broader population of young people using cannabis. The studies are reported in chapters 5 and 7.

The research also aimed to evaluate the factors that are influential in the use of cannabis among young people experiencing first-episode psychosis. Therefore, the factors perceived to be influential for the use of cannabis, cannabis cessation and cannabis abstention were explored from the point of view of the participant using qualitative methods. In particular, this research aimed to highlight the factors that the individual perceived to be influential for the initiation of cannabis use, the continued use of cannabis, changes in the level of use, and the cessation of cannabis. The study also sought to examine the perceived factors associated with cannabis abstention in psychosis among participants with no history of cannabis use. This work is presented in chapter 6.

In summary this programme of research aimed to:

1. Investigate the impact of the course of cannabis use on the symptoms of psychosis (chapters 4 & 5).

2. Examine if factors such as cannabis expectancy, social networks and social status are associated with cannabis use, cannabis cessation and cannabis abstention during the early phase of psychosis (chapter 5).

3. Qualitatively examine the factors that are perceived to influence the use of cannabis, any change in cannabis use and cannabis cessation from the point of view of the participant, as well as to examine the self-perceived factors that relate to cannabis abstention during the first-episode of psychosis (chapter 6).

4. Examine the course of cannabis use among people with first-episode psychosis and people without psychosis who are using cannabis (chapter 7).

5. Test whether the factors that may be associated with the use of cannabis, such as reasons and expectancy for cannabis use, social networks and social status among people with first-episode psychosis are similar to a matched group of young people using cannabis who do not have psychosis (chapter 7).

This research is presented in the following four chapters.

CHAPTER 4

THE COURSE OF CANNABIS USE IN FIRST-EPISODE PSYCHOSIS: EFFECT ON SYMPTOMATIC AND FUNCTIONAL OUTCOME- THE NATIONAL EDEN PROJECT

4.0 Introduction

The early phase of psychosis is thought to represent a 'critical period' which may influence the long term course of illness (Addington, 2007). The biological, psychosocial and cognitive changes influential in the course of psychosis actively develop during this period (Birchwood, 1999), meaning intervention during the early stage of psychosis may have a disproportionate long-term effect in comparison to interventions in the later stages of illness. The National EDEN project aimed to evaluate early intervention services for psychosis; this chapter represents a secondary analysis of the National EDEN data with a specific focus on the use of cannabis.

Research suggests that the use of cannabis may be prognostic for symptomatic outcome in psychosis, with cannabis use associated with an earlier age of psychosis onset (Barnes et al., 2006; Veen et al., 2004), increased positive psychotic symptoms (Grech et al., 2005; A. I. Green et al, 2004), and increased rates of psychotic relapse (Linzen, Dingemans & Lenior, 1994; Hides et al., 2006). Research also suggests that the course of substance use in first-episode psychosis may be influential for later outcome, with continued substance use associated with increased positive psychotic symptoms (Turkington et al, 2009;

Harrison et al., 2008; Baeza et al., 2009) and increased risk of psychotic relapse (Lambert et al., 2005), whilst the cessation of substance use has been associated with an improvement in symptomatic outcome (Turkington et al., 2009; Lambert et al., 2005; González-Pinto et al., 2011). The first-episode of psychosis is a period of significant change in substance use (Wade et al., 2006a; Harrison et al., 2008), however, the majority of research has failed to prospectively assess the impact of change in cannabis use on symptomatic outcome. This methodological shortcoming limits our understanding of the long-term effect of cannabis use in first-episode psychosis, and may lead to erroneous conclusions regarding the impact of cannabis use on symptomatic outcome.

The use of cannabis may also have a deleterious effect on the level of functioning in psychosis, defined here as the level of psychological, social and occupational functioning. Research suggests that patients with heavy substance use may have significantly poorer functioning compared to patients with mild or no substance use, even after controlling for potentially confounding factors such as gender, duration of untreated psychosis, and medication adherence (Wade et al., 2007). Similarly cannabis using patients have been found to have poorer functional outcome compared to non-cannabis using patients (Baeza et al., 2009). Studies that have examined the impact of the course of cannabis use suggest that the cessation of cannabis use may result in significant improvements in functional outcome, whereas the continued use of cannabis may impede functional recovery during the first-episode of psychosis (González-Pinto et al., 2011). However, this association is not supported by all research; some studies have instead found significantly higher levels of functioning among cannabis using patients compared to non-substance using patients (DeRosse, Kaplan, Burdick, Lencz & Malhortra, 2010).

Research in the general population suggests that the use of cannabis may be associated with increased symptoms of mania (Henquet, Krabbendam, de Graaf, ten Have & van Os, 2006a; Lagerberg et al., 2011), and longitudinal research in first-episode psychosis has found the use of cannabis to be associated with increased symptoms of mania at baseline, although the association failed to remain significant at later follow-up (Baeza et al., 2009). Similarly, findings regarding the relationship between the use of cannabis and the symptoms of depression have also been inconsistent. The level of depression and anxiety has been found to be a significant predictor of later psychotic relapse in early psychosis (Hides et al., 2006), and there is some evidence to suggest that the use of cannabis may be associated with increased rates of depression in FEP (Addington & Addington, 2007). However, several studies have failed to find any significant relationship between cannabis use and the symptoms of depression (Baeza et al., 2009; Barnes et al., 2006; González-Pinto et al., 2011). Further research is required in order to understand how the course of cannabis use may impact the symptoms of psychosis as well as the level of functioning, mania and depression during the early stage of psychotic illness.

The duration of untreated psychosis (DUP) has been found to be prognostic for outcome in psychosis. Longer DUP has been associated with increased propensity to psychotic relapse, increased severity of psychotic symptoms, as well as the time to, and length of, psychotic remission (Johnstone, Crow, Johnson, & Macmillan, 1986; Loebel et al., 1992; Haas et al., 1998). It is possible that substance use during the early and prodromal stages of psychotic illness masks the onset of psychosis resulting in a longer DUP, which may in turn result in poorer outcome for psychosis. In support of this, there is some evidence to suggest that substance use in first-episode psychosis may be associated with a longer duration of untreated psychosis (A. I. Green et al., 2004), although other research has

failed to find any relationship between the use of cannabis (Peralta & Cuesta, 1992) or substance use (Barnes et al., 2006) and length of DUP. As the duration of untreated psychosis is an established prognostic factor for the outcome of psychotic illness (Marshall et al., 2005), the association between cannabis use and DUP warrants further investigation.

The aim of the National EDEN project was to evaluate the impact of early intervention services for people with first-episode psychosis at five UK sites (Birmingham, Cornwall, Norfolk, Cambridge and North West England). Data was collected between 2005 and 2009. This chapter is a secondary analysis of the National EDEN dataset for one of the project sites. The analysis aims to examine the relationship between the use of cannabis and the symptoms of psychosis in FEP over a period of twelve months after entry to treatment. This study aims to answer several key questions;

I) What is the prevalence and course of cannabis use over time in first-episode psychosis?

II) Does the use of cannabis affect psychotic symptoms at treatment entry?

III) Does the course of cannabis use (never used, continuous use, cannabis cessation) during the first twelve months after entry to treatment affect the outcome of psychotic symptoms, depression, mania and psycho-social functioning?

4.1 Method

4.1.1 Participants

The sample comprised all consecutive referrals over a period of four years (2005 to 2009) to a specialised NHS service for first-episode psychosis; (referred to hereafter as the Early Intervention Service). This service manages all cases of first-episode psychosis in a catchment area that serves a population of 1.2 million.

All participants were required to provide fully informed consent and were aged between 14 and 35 years of age. People with drug induced psychosis and affective psychoses were included, people with intellectual disability were excluded.

4.1.2 Measures

4.1.2.1 Drug use

Current cannabis use was defined as any use of cannabis within the previous three months. Lifetime substance use was assessed via client interview and review of patient records.

4.1.2.2 The Drug Check Scale- (Kavanagh, Saunders, Young, Jenner, & Claire, 1998)

Information regarding the quantity, frequency and amount spent on a range of drugs within the last three months was assessed using a measure developed by Kavanagh et al. (1998). This measure also contains a 12 item scale to assess the level of self-reported problems

associated with a specified substance, or the drug that is associated with the greatest level of problems. In the current study participants provided information for the drug that had caused the greatest amount of problems.

The 12 item problem scale encompasses a range of problems that may arise as a result of substance use (financial, housing, legal, relationship, work, and health difficulties, risk taking, increase in symptoms) and is scored using a three point response format, with higher scores indicative of increased adverse drug related consequences and problems. Kavanagh and colleagues (1998) developed the scale by adapting eight items from the Problem Drinking Questionnaire (Sitharthan, Kavanagh & Sayer, 1996) to represent areas of functional impact, with four additional items adapted from questions in the Composite International Diagnostic Interview (CIDI; World Health Organisation, 1997) to cover the psychological impact of substance use.

The problem scale has demonstrated high internal consistency (0.91), and an optimal cut off score of ≥2 is recommended, yielding 97% sensitivity and 84% specificity in detecting a CIDI diagnosis of abuse or dependence (Kavanagh et al., 2011). The measure also contains two additional items designed to measure the level of motivation and confidence to change.

4.1.2.3 The Severity of Dependence Scale - (SDS; Gossop et al., 1995)

This five item unidimensional scale provides a measure of the level of drug dependence in the last 12 months. The scale is not designed to encompass the full spectrum of the dependence syndrome, but focuses on the degree of psychological dependence or

compulsive use, as evidenced by concern over impaired control. The measure is scored using a five point scale with higher scores indicative of greater levels of dependence.

The SDS has been validated for use across a range of substances (Gossop et al., 1995), with moderate internal consistency (Cronbach's alpha = 0.72) and a single factor structure when used to measure cannabis dependence (Swift, Hall, Didcott & Reilly, 1998). An optimal cut-off score of ≥3 is recommended for detecting cannabis dependence, with corresponding sensitivity and specificity values of 64% and 82% respectively (Swift, Copeland & Hall, 1998).

The scale has also been validated for the assessment of cannabis dependence among individuals with psychosis (Hides, Dawe, Young & Kavanagh, 2007; Kavanagh et al., 2011), with high internal consistency (0.81), high predictive accuracy (84.3%), and a single factor structure accounting for 56.8% of the variance (Hides et al., 2007). An optimal cut-off score of ≥2 is recommended for this population, which yields corresponding sensitivity and specificity values of 0.86 and 0.83 respectively. Using this lower cut- off score, 85.5% of cases and 82.9% of non-cases are correctly identified (Hides et al., 2007).

In the current study the severity of dependence scale was used to assess the level of cannabis dependence in the last three months.

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

The positive and Negative Syndrome Scale (PANSS) provides a standardised evaluation tool for the signs and symptoms of schizophrenia. The scale is a comprehensive, trained-clinician led structured interview used to assess the positive, negative and general psychopathology of schizophrenia.

The scale comprises 30 items, scored on a seven point scale, with 7 items for the positive symptoms, 7 items for the negative symptoms and 16 items for general psychopathology. The scale includes all of the items from the Brief Psychiatric Rating Scale (BPRS) (Overall & Gorham, 1988) and select items from the Psychopathology Rating Scale (Singh & Kay, 1987). The measure is widely used in clinical and research settings and demonstrates good psychometric properties (Kay, Opler & Lindenmayer, 1989; Kay & Sevy, 1990).

4.1.2.5 The Calgary Depression Scale (CDSS; Addington, Addington, Maticka-Tyndale & Joyce, 1992)

The CDSS is a nine item structured interview scale specifically developed to assess the level of depression in schizophrenia. Each item is scored on a four point scale, ranging from 0 (absent) to 3 (severe), with each point anchored by descriptors. The measure has a high degree of specificity and is not confounded by the negative or extrapryramidal symptoms of psychosis (Addington, Addington & Maticka-Tyndale, 1994).

The scale was developed based on the Present State Examination (Wing, Cooper & Sartorius, 1974) and the Hamilton depression rating scale (Hamilton, 1960), although only 4 items were retained from the original Hamilton scale. The scale has a single factor structure with high internal consistency (cronbach's alpha = 0.79), high correlation with other standardised depression scales, and has been found to result in the correct classification of patients in 93% of cases (Addington et al., 1992). The CDSS is often regarded as the 'gold standard' for the identification of depressive symptoms in schizophrenia (Kim et al., 2006).

4.1.2.6 The Young Mania Rating Scale (YMRS; Young, Biggs, Ziegler & Mayer, 1978)

The YMRS (Young et al., 1978) is an 11 item scale scored across five grades of severity (range 0-4), with higher scores indicative of greater severity of symptoms. The 11 items reflect the main symptoms of mania or bipolar affective disorder, and descriptors are provided for each level of symptom severity. The scale is administered by trained clinicians during a 15 to 30 minute interview and is designed to assess the symptoms of mania over the preceding 48 hours, based on patient self-report and behavioural observations during the course of interview (Young et al., 1978).

The scale demonstrates a high level of inter-rater reliability (0.93), and has high correlation with other established mania scales. The measure has also been found to have a good level of sensitivity and can differentiate between the phases of pre- and post-treatment (Young et al., 1978).

4.1.2.7 Global Assessment of Functioning Scale (GAF; Endicott, Spitzer, Fleiss & Cohen, 1976)

The global assessment of functioning scale is a single rating scale for evaluating the level of psychological, social and occupational functioning on a continuum from 1-100, with higher scores indicative of better levels of functioning. The scale comprises an overall score, as well as separate scores for the level of symptoms and disability; the symptom and disability scales are scored along a range of 1-90.

The scale has been found to have moderate inter-rater reliability (ranging from 0.53 – 0.66) (Rey, Starling, Wever, Dossetor & Plapp, 1995) and has demonstrated satisfactory levels of reliability for GAF total (0.76), symptoms (0.71) and disability (0.74) (Jones, Thonicroft, Coffey & Dunn, 1995). The validity of the symptoms and function scale dimensions have been confirmed by discriminant and concurrent associations to other clinical measures of symptom distress and social functioning (Pedersen & Karterud, 2012).

4.1.3. Procedure

All clients were approached to take part in the study upon admission to the Early Intervention Service. All assessments were conducted by the National EDEN research psychologist and took approximately one hour to complete. Assessments took place at entry to treatment (T1), six month follow-up (T2) and twelve month follow-up (T3). Drug use was only assessed at T1 and T3.

4.1.4 Data Analysis

All data was analysed using SPSS version 18 statistical software. The exact significance values are reported for each statistical analysis, and an alpha level of 0.05 was used for all statistical tests.

All data was tested for normality of distribution using the Kolmogorov-Smirnov test prior to analysis. Data found to be non-normally distributed with positive skew was transformed using log-transformation. In cases where data continued to have a non-normal distribution, non-parametric methods were used where possible.

Changes in the severity of psychotic symptoms for the whole sample were analysed using Friedmans analysis of variance (ANOVA).

Changes in the level of cannabis use dependence and cannabis related problems over the 12 months after entry to treatment were analysed using paired samples t-tests. The effect of cannabis use on the length of DUP and age of psychosis onset was analysed using independent samples t-tests. Mann-Whitney tests were used to compare cannabis using and non-using participants at entry to treatment for the symptoms of psychosis, depression, mania and functioning.

The course of cannabis use over the 12 month study period was calculated, with the sample divided into participants that had no use of cannabis (i.e. no use of cannabis at baseline or 12 month assessment, n=180), participants that continued to use or initiated cannabis use (i.e. use of cannabis at baseline and 12 month assessment or no use of cannabis at baseline but cannabis use at 12 months, n= 38), and participants that stopped

using cannabis (i.e. use of cannabis at baseline but no use of cannabis at 12 month assessment, n= 18). Mixed ANOVAs were used to examine the impact of the course of cannabis use on change in psychotic symptoms, mania, depression and the level of functioning during the first 12 months after entry to treatment. Planned comparisons using bonferroni tests were used to examine significant main effects. Significant interactions were examined using paired samples t-tests, with significance values adjusted using bonferroni correction.

All effect sizes were calculated by hand, and are denoted by an italicised *r*. However, effect sizes cannot be calculated for Friedmans ANOVA or mixed ANOVA designs of analysis that compare more than two groups, and are not reported for these analyses.

4.2 Results

4.2.1 Participants

A total of 348 participants completed the baseline data collection phase at entry to treatment; 20% (n= 70) reported the use of cannabis. The sample was predominantly male (73%, n= 255) with a mean age of 22 (± 4.3). White British accounted for the largest ethnicity (39%) followed by Asian Pakistani (25%). There were no significant differences in age [$t(335) = 0.235$, $p = 0.81$] or gender [$\chi^2(1) = 0.48$, $p = 0.82$] between participants using cannabis and participants not using cannabis at baseline assessment.

The rate of attrition from assessment at treatment entry to assessment at 12 months was 28% (n=96). There were no differences in age [$t(346) = 1.04$, $p = 0.29$], gender [χ^2 (1) = 0.032, $p = 0.89$], psychiatric diagnosis [χ^2 (5) = 6.16, $p = 0.29$], or the use of cannabis at baseline [χ^2 (1) = 0.649, $p = 0.45$] for participants who remained in the study compared to participants who were lost to follow-up.

There was a 30% (n= 152) refusal rate for consent to take part in the study. There were no significant differences between participants that took part in the study and those that did not in terms of age [$t(498) = -.939$, $p = 0.35$] or gender [χ^2 (1) = 1.23, $p = 0.27$].
The main referral pathways to the Early Intervention Service for participants in this study are shown in table 4.1.

Table 4.1: Referral pathway for participants to the Early Intervention Service

Referral Pathway	n	%
HTT	113	32.5
CMHT	71	20.4
Psychiatric Hospital	44	12.6
Other	41	11.8
PCT	35	10
Psychiatrist	15	4.3
Adolescent Psychiatrist	14	4.0
CPN	4	1.1
Unrecorded	4	1.1
Counsellor	2	0.6
Casualty Department	2	0.6
Psychiatrist (Addictions)	2	0.6
Neurologist	1	0.3
Total	348	100

4.2.2 Change in symptom scores during the first twelve months of treatment

Change in symptom scores between assessment at baseline (T1), six months (T2) and twelve months (T3) were assessed for the whole participant sample. There was found to be a significant improvement from T1 to T2 and T1 to T3 for the positive and negative symptoms of psychosis, as well as the level of general psychopathology [positive: χ^2 (2)= 21.68, p = 0.000, negative: χ^2 (2)= 15.06, p = 0.000, general: χ^2 (2)= 48.36, p = 0.000]. Similarly, there was significant improvement in the symptoms of mania [χ^2 (2)= 13.13, p = 0.001], depression [χ^2 (2)= 24.19, p = 0.000], GAF functioning [χ^2 (1)= 27.32, p = 0.000], GAF symptoms [χ^2 (1)= 22.07, p = 0.000] and GAF disability [χ^2 (1)= 16.36, p = 0.000] from T1 to T2 and T1 to T3.

4.2.3 Drug use at treatment entry and changes in cannabis use over time

There was a high prevalence of lifetime use of drugs (59%, n=193), with cannabis accounting for most of this (94% n= 182). Rates of lifetime and current drug use other than cannabis were low. The prevalence of cannabis use at treatment entry (T1) was 20% (n=70), the rate of cannabis use had decreased to 12% (n=40) at assessment at twelve months (T3). The difference in the proportion of participants using cannabis at treatment entry compared to follow-up at twelve months was significant [χ^2 (1) = 68.78, P= 0.000]. There was also a significant decrease in the level of cannabis dependence [T1: mean 3.88, T3: mean 1.75; $t(15)= 2.295$, $p = 0.03$, $r = 0.51$], and cannabis related problems [T1:mean 6.25, T3 mean 1.94; $t(15)=3.262$; $p = 0.005$, $r = 0.42$] between assessment at treatment entry and assessment at 12 months.

4.2.4 Cannabis use at treatment entry- association with DUP, age of psychosis onset and symptoms

The mean length of DUP for the whole participant sample was 231.77 (± 458.06), with a mean age of psychosis onset of 20.69 (±4.36). There was no significant relationship between the use of cannabis at treatment entry and the length of DUP [$t(298)= -0.265$, $p = 0.79$] or the age of psychosis onset [$t(315)= -0.100$, $p = 0.92$].

There was a significant relationship between cannabis use and the symptoms of mania [$U = 5619.50$, $z = -2.36$, $p = 0.018$, $r = -0.13$], with cannabis users having significantly increased symptoms of mania compared to participants with no cannabis use. The results indicate that there was no significant relationship between the use of cannabis at entry to treatment and the symptoms of depression [$U = 6652.00$, $z = -1.00$, $p = 0.316$, $r = -0.05$],

positive psychotic symptoms [$U = 6586.50$, $z = -1.52$, $p = 0.13$, $r = -0.08$], negative psychotic symptoms [$U = 6821.00$, $z = -1.00$, $p = 0.31$, $r = -0.05$], or the level of general psychopathology [$U = 7209.50$, $z = -0.373$, $p = 0.710$, $r = -0.02$]. Similarly, no significant relationship was found between the use of cannabis and the level of overall GAF functioning [$U = 7150.00$, $z = -0.56$, $p = 0.57$, $r = -0.03$], GAF symptoms [$U = 7179.00$, $z = -0.71$, $p = 0.48$, $r = -0.04$], or GAF disability [$U = 7051.500$, $z = -0.87$, $p = 0.39$, $r = -0.04$]. See table 4.2.

Table 4.2: Mean symptom scores, DUP and age of psychosis onset for participants with and without cannabis use at treatment entry.

	Cannabis use at T1 (n= 70) (*Mean, SD*)	No cannabis use at T1 (n= 267) (*Mean, SD*)
PANSS Positive symptoms	13.22 (5.21)	12.13 (4.95)
PANSS Negative symptoms	13.20 (5.89)	14.08 (6.18)
PANSS General psychopathology	28.95 (8.38)	28.68 (8.66)
Calgary Depression	5.07 (5.23)	4.16 (4.56)
Young Mania	4.66 (5.11)	3.32 (4.99)*
GAF functioning	52.70 (17.46)	53.77 (16.02)
GAF symptoms	56.34 (15.84)	57.58 (14.37)
GAF disability	55.08 (13.91)	57.06 (14.79)
Age of psychosis onset	20.72 (4.26)	20.66 (4.42)
Length of DUP (days)	249.31 (333.29)	231.73 (492.65)

Note: * $p < 0.05$

4.2.5 The course of cannabis use after entry to treatment and symptomatic change over time

Participants were categorised according to the course of cannabis use over the twelve month period after entry to treatment; participants with no cannabis use (n= 180), participants that continued to use or initiated cannabis use (n=38), and participants that stopped using cannabis (n=18). The three participant groups were then compared for change in the level of symptoms from assessment at treatment entry to assessment at twelve month follow-up. This was done using mixed ANOVAs, planned comparisons using bonferroni tests were used to examine significant main effects, significant interactions were examined using paired samples t-tests adjusted using bonferroni correction (see table 4.3).

Table 4.3: Mean symptom scores at baseline and 12 month follow-up assessment for participants that continued to use cannabis, stopped using cannabis and had no history of cannabis use.

Symptom Scales	Continued cannabis use (n= 38)		Stopped cannabis use (n= 18)		No use of cannabis (n= 180)	
	Baseline [T1] *(Mean, SD)*	12 months [T3] *(Mean, SD)*	Baseline [T1] *(Mean, SD)*	12 months [T3] *(Mean, SD)*	Baseline [T1] *(Mean, SD)*	12 months [T3] *(Mean, SD)*
PANSS Positive symptoms	13.64 (5.47)	12.43 (5.69)	11.18 (3.43)	10.55 (4.03)	12.03 (4.8)	10.42 (4.07)
PANSS Negative symptoms	13.11 (5.27)	13.50 (6.07)	15.00 (7.58)	15.91 (7.02)	14.75 (5.97)	13.15 (6.09)
PANSS General Psychopathology	29.21 (6.95)	27.57 (9.31)	26.50 (7.89)	21.60 (2.84)	28.58 (8.51)	24.51 (7.75)
Calgary Depression	5.30 (5.16)	2.96 (3.91)	6.36 (4.95)	2.55 (3.27)	3.92 (4.46)	2.52 (3.87)
Young Mania[a]	5.60 (6.00)	5.44 (6.09)	2.91 (3.48)	1.73 (3.85)	3.27 (5.23)	2.19 (3.61)
GAF functioning[b]	52.75 (13.70)	52.16 (15.79)	48.15 (21.24)	66.62 (15.90)	53.18 (15.77)	61.85 (18.66)
GAF symptoms[b]	54.82 (13.93)	55.03 (16.19)	50.92 (64.92)	64.92 (14.47)	57.35 (15.01)	64.43 (16.81)
GAF disability[b]	55.79 (13.64)	54.82 (17.23)	51.54 (14.41)	58.85 (15.66)	56.27 (15.08)	63.37 (17.37)

Note: Higher symptom scores on the GAF denote better functioning.

[a] bonferroni planned comparisons indicate significantly higher mania for participants with continued versus no cannabis use

[b] post-hoc comparisons using paired samples t-tests with values adjusted using bonferroni indicate significant improvements for participants with cannabis cessation and no use of cannabis, but no significant improvement for participants with continued cannabis use

4.2.5.1 Cannabis use and change in psychotic symptoms

The results indicate that there was a trend for improvement in the level of positive psychotic symptoms over the 12 month period [$F(1, 185)= 3.039$, $p = 0.08$], and borderline significance for differences between participant groups in the level of positive psychotic symptoms [$F(2, 185)= 2.976$, $p =0.053$]. There was no significant interaction between the course of cannabis use and the level of positive psychotic symptoms [$F(2, 185)= 0.208$, $p = 0.81$]. Post-hoc planned comparisons using bonferroni were used to further examine the trend differences between participant groups. The results indicate that there was no significant difference between participants with continued cannabis use and participants that stopped using cannabis ($p = 0.30$), but there was borderline significance ($p = 0.056$) between participants with no cannabis use and participants that continued to use, with increased positive symptoms among participants that continued to use cannabis.

There was no significant change in the level of negative symptoms over the 12 month period [$F(1, 182)= 0.020$, $p = 0.88$], no significant difference between participant groups for the level of negative psychotic symptoms [$F(2, 182)= 0.639$, $p = 0.52$] and no significant interaction between the course of cannabis use and the level of negative symptoms [$F(2, 182)= 2.210$, $p = 0.11$].

There was a significant improvement in the level of general psychopathology over the 12 month period [$F(1, 182)= 9.660$, $p = 0.002$]. There was no significant difference between participant groups for the level of symptoms [$F(2, 182)= 1.732$, $p = 0.180$] and no significant interaction between the course of cannabis use and the level of general psychopathology [$F(2, 182)= 0.932$, $p = 0.396$].

4.2.5.2 Cannabis use and change in depression and mania

The level of depressive symptoms was found to significantly improve over the 12 month period [$F(1, 178)= 19.326$, $p = 0.000$]. The results indicate that there were no significant differences between participant groups for the level of depressive symptoms [$F(2, 178)= 1.242$, $p = 0.29$], and no significant interaction between the course of cannabis use and the symptoms of depression [$F(2, 178)= 1.689$, $p = 0.18$].

The results indicate that there was no significant change in the symptoms of mania over the 12 month period [$F(1, 182)= 1.387$, $p = 0.24$], and no significant interaction between the course of cannabis use and the symptoms of mania [$F(2, 182)= 0.302$, $p = 0.72$]. There was a significant between group effect of cannabis use course on the symptoms of mania [$F(2, 182)= 6.041$, $p = 0.003$]. Post-hoc planned comparisons using bonferroni tests indicate that there were significant differences between participants that continued to use cannabis and participants with no cannabis use ($p = 0.002$) and trend significance for differences between participants that continued to use cannabis and participants that stopped the use of cannabis ($p = 0.062$), with participants that continued to use cannabis found to have a greater level of mania symptoms.

4.2.5.3 Cannabis use and change in the level of functioning

The results indicate that there was a significant improvement in the level of overall functioning [$F(1, 196)= 21.846$, $p = 0.000$], symptoms [$F(1, 198)= 13.521$, $p = 0.000$] and disability over the 12 month period [$F(1, 197)= 6.438$, $p = 0.01$]. There were no significant differences between participant groups in overall functioning [$F(2, 196)= 1.566$, $p = 0.21$], symptoms [$F(2, 198)= 2.889$, $p = 0.058$] or disability [$F(2, 197)= 1.863$, $p = 0.15$]. The

results indicate that there were significant interactions between the course of cannabis use and change in overall functioning [$F(2, 196)= 6.845$, $p = 0.00$], symptoms [$F(2, 198)= 3.536$, $p = 0.03$] and disability [$F(2, 197)= 3.652$, $p = 0.02$], suggesting a differential rate of change in the level of functioning between participant groups.

Post-hoc, paired samples t-tests were used to examine significant interactions (i.e. differences in the rate of functional improvement in each participant group). Significance values were adjusted using bonferroni correction, so that data had to reach a significance of $p < 0.016$. The results indicate that participants with no use of cannabis significantly improved in the level of overall functioning [$t(153)= -6.269$, $p = 0.000$], symptoms [$t(154)= -5.334$, $p = 0.000$] and disability [$t(153)= -5.455$, $p = 0.000$], and participants that stopped using cannabis also significantly improved in functioning [$t(12)= -4.168$, $p = 0.001$], symptoms [$t(12)= -3.410$, $p = 0.005$] and disability [$t(12)= -2.802$, $p = 0.016$]. However, participants that continued to use cannabis had no significant improvement in the level of functioning [$t(31)= 0.224$, $p = 0.82$], symptoms [$t(32)= -0.59$, $p = 0.95$] or disability [$t(32)= 0.361$, $p = 0.72$] during the 12 months after entry to treatment. (See figure 4.1 for the interaction between cannabis use and the level of overall functioning).

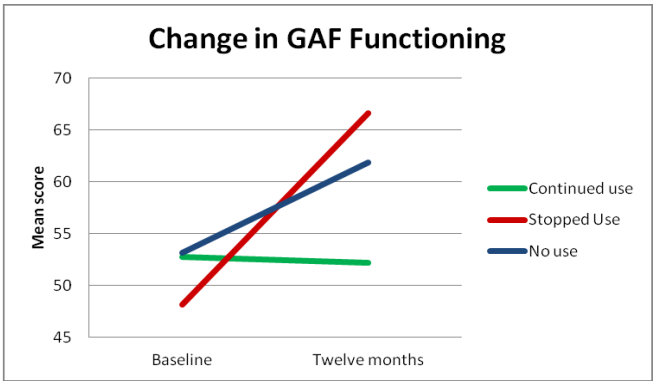

Figure 4.1: Change in level of overall functioning from baseline to twelve month follow-up assessment according to the course of cannabis use.

4.2.6 Observed power

The primary aim of this study was to determine if the course of cannabis use was prognostic for symptomatic outcome at twelve month follow-up during the first-episode of psychosis. Therefore the observed power was calculated for any change in positive psychotic symptoms for participants that continued to use cannabis, stopped using cannabis or had no use of cannabis (section 4.2.5.1). The results indicate that there was 41% power to detect significant change in positive psychotic symptoms between assessment at baseline and assessment at twelve month follow up, 57% power to detect significant differences in the level of psychotic symptoms between the three participant groups and 8% power to detect a significant interaction between change over time in the level of positive psychotic symptoms and participant group.

4.3 Discussion

This study aimed to examine the relationship between the course of cannabis use and the symptoms of psychosis, depression, mania and functioning over a period of twelve months after entry to treatment for first-episode psychosis. The results of the study indicate that the continued use of cannabis may impede recovery in psychological, social and occupational functioning as measured by the global assessment of functioning scale. However, the results indicate that the cessation of cannabis use may be associated with significant improvements in the level of functioning. The study also suggests that the continued use of cannabis may be associated with increased levels of mania during the first-episode of psychosis.

The course of cannabis use has been found to be prognostic for outcome in psychosis, with continued substance use associated with increased positive psychotic symptoms, depression, and poorer functional outcome compared to patients that stop or have no history of substance use (Harrison et al., 2008; Lambert et al., 2005; Turkington et al., 2009). Research also indicates that the cessation of substance use is associated with significant improvements in positive psychotic symptoms and functional outcome (Baeza et al., 2009; González-Pinto et al., 2011). This study provides further support for the deleterious effect of continued cannabis use for functional outcome. Participants that continued to use cannabis over the 12 months after entry to treatment had no significant improvement in the level of functioning compared to participants with no use of cannabis, or participants that stopped using cannabis.

The impact of cannabis use on the symptoms of mania has received relatively little empirical investigation, although there is some data to suggest that the use of cannabis may be an antecedent factor in the development of bipolar disorder in vulnerable individuals (Lagerberg et al., 2011) and manic symptoms in the general population (Henquet et al., 2006a). There is also some data to suggest that the use of cannabis may be associated with increased levels of mania in first-episode psychosis (Baeza et al., 2009). The results of the current study lend further support to these findings and suggest that the use of cannabis among people experiencing their first psychotic episode may increase the risk of experiencing significantly greater symptoms of mania.

The mechanism by which the use of cannabis might affect functional outcome or the symptoms of mania in first-episode psychosis has not yet been identified. However, persistent use of cannabis during the early stage of psychosis has been associated with reduced adherence to anti-psychotic medication (Turkington et al., 2009), and it is possible that the use of cannabis may affect the outcome of psychosis by contributing towards treatment non-compliance, or by affecting the metabolism and pharmokinetics of anti-psychotic medication (Linszen et al., 2004).

There is some evidence to suggest that substance use may be associated with a longer duration of untreated psychosis (A. I. Green et al., 2004), perhaps due to substance use masking the onset of psychosis, resulting in a longer delay in accessing treatment. However, other research has failed to support this (Barnes et al., 2006; Peralta & Cuesta, 1992), and no significant association was found between cannabis use and DUP in the current study. The use of cannabis has also been associated with a younger age of psychosis onset (Barnes et al., 2006; Caspari, 1999), although this association was not

supported by the results of the current study. In line with previous research (Baeza et al., 2009; Barnes et al., 2006; González-Pinto et al., 2011) the current study found no association between cannabis use and the symptoms of depression.

Research has found the use of cannabis to result in greater positive psychotic symptoms (Grech et al., 2005), although other studies have failed to find any significant association between cannabis use and psychotic symptom severity (Peralta & Cuesta, 1992). The current study found no significant relationship between the use of cannabis and psychotic symptoms, either at entry to treatment or after 12 months of continuous use. It is possible that participants in this study were using cannabis at levels too low to exacerbate psychotic symptoms, particularly as research suggests there is a dose-response relationship between the use of cannabis and the symptoms of psychosis, with increased adverse effects occurring with greater levels of cannabis use (Lambert et al., 2005; Linszen et al., 1994, Wade et al., 2007). It is suggested that future research also measures the severity of cannabis use in order to fully understand the relationship between the use of cannabis and the symptoms of psychosis during the early phase of psychotic illness. However, there is evidence to suggest that the study lacked sufficient power to detect significant effects of continued cannabis use on the positive symptoms of psychosis. The results indicate trend significance for a higher level of positive psychotic symptoms among participants that continued to use cannabis compared to participants with no use of cannabis; it is possible that this result would have reached significance with a larger sample size. It is considered unlikely that the null findings in this study of continued cannabis use on other symptom variables (i.e. negative psychotic symptoms, general psychopathology, and depression) are the result of low statistical power as the data failed to show trend significance and there were similar mean scores between participant groups.

This study suggests that the course of cannabis use, that is continued cannabis use or cannabis cessation may be important for longer-term outcome for functioning and mania during the first-episode of psychotic illness. A small number of studies have prospectively examined the impact of the course of cannabis use on symptomatic outcome in early psychosis (Grech et al., 2005; Baeza et al., 2009; González-Pinto et al., 2011). There is a lack of research utilising this type of research design among people with long-term multi-episode psychosis, but there is some evidence to suggest that the continued use of cannabis among individuals with long-term psychosis is associated with an increased rate of psychotic relapse compared to patients that stop using cannabis (Martinez-Arevalo, Calcedo-Ordonez & Varo-Prieto, 1994). Therefore, the continued use of cannabis appears to be associated with a poorer outcome in psychosis, irrespective of the stage of illness.

The first-episode of psychosis has been found to be a period of significant decline in the level of substance use (Wade et al., 2006a; Harrison et al., 2008), yet the majority of studies have failed to assess the impact of change in cannabis use on psychotic outcome during the early stage of illness. The current study addresses this limitation of previous research. The study examined the relationship between the use of cannabis and psychopathology at entry to treatment, as well as prospectively examining the association between the course of cannabis use (i.e. continued use, cessation or abstention) and the level of psychotic symptoms, functioning, depression and mania.

This study has several limitations. This chapter is a secondary analysis of an existing data, thus the data-set was not collected for the primary aim of prospectively investigating the impact of cannabis use on the symptoms of psychosis. As a result, data was missing in relation to the frequency and quantity of cannabis use for a number of participants and so

the severity of cannabis use was not assessed in this study. The age of cannabis use onset and the duration of cannabis were not examined in the present study, although there is some evidence to suggest the symptoms of psychosis are more persistent with a longer duration of cannabis use (Kuepper et al., 2011). The study may also have benefited from a longer length of follow-up, as other prospective research suggests that it may take as long as five years after entry to treatment for the effects of continued cannabis use and cannabis cessation on the course of psychosis to become apparent (González-Pinto et al., 2011). Lastly, the alpha level was not adjusted for multiple comparisons in relation to effect of cannabis use on psychotic symptoms at entry to treatment (see section 4.2.4), which may have increased the probability of a type I error. This could have implications for the validity of the finding for increased manic symptoms among participants using cannabis, however this finding was further confirmed in the prospective analysis of the impact of continued cannabis use on the symptoms of mania (see section 4.2.5.2) for which the alpha level was adjusted for multiple comparison. Therefore, it is argued it is valid to conclude that the use of cannabis may adversely impact the symptoms of mania during the first-episode of psychosis.

This large scale, prospective, twelve month study of patients with first-episode psychosis provides evidence that the use of cannabis may be a prognostic factor for the level of functioning and the severity of mania during the early phase of illness. The results suggest that continued use of cannabis may impede recovery in functioning, whereas the cessation of cannabis use may be associated with significant improvements in functional outcome. The continued use of cannabis may also be associated with increased levels of mania for people with first-episode psychosis. It is suggested that interventions for cannabis use are

implemented during the early stage of first-episode psychosis in order to improve the long-term symptomatic outcome for psychosis.

CHAPTER 5

FACTORS ASSOCIATED WITH CANNABIS USE, CESSATION AND ABSTINENCE IN FIRST-EPISODE PSYCHOSIS

5.0 Introduction

Research suggests that the use of cannabis may be associated with increased psychotic symptoms (Addington & Addington, 2007; Cleghorn et al., 1991), and the results of the National EDEN project reported in the previous chapter suggest that the continued use of cannabis may be associated with increased symptoms of mania and may impede the recovery of psychological, social and occupational functioning for people with first-episode psychosis. Therefore it is important that we understand what drives the use of cannabis and what may influence cannabis cessation and abstention among this population.

Cannabis use expectancies, defined as the effects expected to occur following the use of cannabis, are believed to be aetiological for the development of cannabis use (Stacy, 1995) and have been found to be predictive of the level of future consumption (Chabrol et al., 2006). Cannabis expectancy has been extensively examined in the general population, with research suggesting that increased negative expectancy is associated with cannabis abstention (Galen & Henderson, 1999; Aarons et al., 2001), whereas increased positive expectancy is associated with the continued use of cannabis (Simon & Arens, 2007). Research in psychosis has found cannabis expectancy to be predictive of past use of cannabis as well as the severity of cannabis dependence (Hides et al., 2009), and there is

some evidence to suggest that patients with a history of substance use may have different cannabis expectancies compared to never users (Mueser et al., 1995). However, research has not examined if expectancy differs according to the use, cessation and abstention from cannabis use among people with psychosis. Further research is required to examine if there is a relationship between cannabis expectancy and cannabis use behaviour among people with psychosis, especially during the first-episode of illness.

Understanding the individual factors that motivate the use of cannabis is undoubtedly important but it is also essential to understand the social context of cannabis use. Substance use among patients with psychosis has been conceptualised as a socio-environmental phenomenon, with peer influence, social affiliation and social activity important in maintaining continued substance use (Drake et al., 2002). It has also been suggested that the use of cannabis may be an important way for people with psychosis to maintain social contacts (Schofield et al., 2006). Indeed research indicates that the social lives of many patients revolve entirely around the use of drugs, and patient self-ratings of their social lives have been found to positively correlate with the amount of cannabis used in the preceding two months (Baigent et al., 1995). Research also indicates that patients with psychosis who engage in substance use are more socially competent, have a higher level of social functioning and larger social networks compared to non-substance using patients (Salyers & Mueser, 2001). Psychosocial issues have been argued to be "critical in our attempts to address substance abuse in this population" (Drake et al., 2002, pp.100), despite this however, the relationship between cannabis use and social networks in psychosis has not yet been examined. Research in the general population indicates that association with drug using peers may be influential for drug use initiation, whilst association with non-drug using peers is thought to inhibit the use of drugs (Chabrol et al.,

2006). Examination of specific variables related to the social network such as network size and composition may therefore highlight if social networks are associated with cannabis use, cessation or abstention among people with first-episode psychosis. Research indicates that there may be a loss of contact with the social network following the onset of psychosis (Macdonald et al., 2005). It is therefore important that we understand the relationship between the social network and cannabis use before any network change occurs; in order to do this it is necessary for research to examine social networks during the early phase of psychosis.

A comprehensive understanding of the individual's social environment such as the social network and the processes involved in social relationships may be important in furthering our understanding of cannabis use behaviour in psychosis. Comparative judgements of social status, such as social rank, attractiveness and group fit are an essential element of social relationships (Allan & Gilbert, 1995). Social comparison has been proposed to account for the interactional difficulties and social avoidance among people with depression (Swallow & Kuiper, 1988) and data from animal studies suggests that social rank may be associated with social avoidance (Blanchard & Blanchard, 1990). Therefore it is possible that the differences in social functioning and social network size between substance using and non-substance using patients with psychosis (Salyers & Mueser, 2001) relates to underlying differences in perceived social rank. It may be that the use of cannabis increases the opportunity for social facilitation and development of a social network, which in turn results in higher perceived social status. Firstly however, research needs to explore the perceived social rank of substance using and non-substance using patients with first-episode psychosis.

The previous chapter explored the association between the use of cannabis during the first-episode of psychosis and the level of psychotic symptoms. The early stage of psychosis may be crucial in determining the long-term outcome of illness (see chapter 1 for a review), making it important to understand the effect of cannabis use in FEP. Research suggests that the use of cannabis during the early stage of psychosis is associated with increased positive psychotic symptoms (Grech et al., 2005; A. I. Green et al., 2004) and a higher rate of psychotic relapse (Linzen et al., 1994; Hides et al., 2006), and the continued use of drugs has been found to impede the recovery from psychotic symptoms (Turkington et al., 2009; Harrison et al., 2008; Baeza et al., 2009). However, the National EDEN project described in the previous chapter found no significant effect of cannabis use on the symptoms of psychosis; these results therefore require replication. Previous evidence has also indicated that there is a dose-response relationship between cannabis use and psychotic symptoms, with increased use of cannabis associated with increased symptom severity (Lambert et al, 2005; Linszen et al., 1994, Wade et al., 2007). This association was not examined as part of the National EDEN project, but investigation of this may help to explicate the effect of cannabis use during the first-episode of psychosis.

This study aimed to identify if cannabis expectancy, social networks and social status are associated with cannabis use, cessation and abstention during the first-episode of psychosis. In order to do this a cross-sectional design was used to compare patients who were i). using cannabis, ii). had stopped using cannabis or iii). had no history of cannabis use. The study also aimed to prospectively examine the relationship between the symptoms of psychosis and continued cannabis use, cannabis cessation and cannabis abstention over a period of six months during the early stage of psychotic illness.

The study aimed to test five hypotheses:

I. Participants that have stopped or have never used cannabis will have greater negative cannabis expectancy and less positive cannabis expectancy compared to current cannabis users.

II. Current cannabis users will have larger social networks, more cannabis users and less cannabis abstainers within their social networks compared to participants that have stopped or have never used cannabis.

III. Current cannabis users will have a higher level of perceived social status (social rank, attractiveness and group fit) compared to participants that have stopped or have never used cannabis.

IV. There will be a cross-sectional relationship between the use of cannabis and psychotic symptoms, with higher levels of cannabis use associated with increased severity of positive psychotic symptoms.

V. There will be a greater improvement in positive psychotic symptoms over a period of six months for participants that have stopped or have no history of cannabis use compared to participants that continue to use cannabis.

5.1 Method

5.1.1 Participants

The sample comprised all consecutive referrals over a period of four years (2005 to 2009) to a specialised NHS service for first-episode psychosis. This service manages all cases of first-episode psychosis in a catchment area that serves a population of 1.2 million.

Three participant groups were recruited; i) current cannabis users (i.e. any use of cannabis within the previous three months), ii) participants that had stopped the use of cannabis (i.e. lifetime use of cannabis but no use within the previous three months), and iii) participants with no history of cannabis use (i.e. no lifetime use of cannabis).

To be eligible to take part in the study participants had to be aged between 18 and 35 years of age. Patients were not eligible to take part in the study if they were unable to provide written informed consent, or it was felt by the clinical team that the individual was too mentally unwell to participate (i.e. if it was felt that the client was experiencing severe florid psychotic symptoms).

5.1.2 Measures

All participants completed measures of cannabis expectancy (Aarons et al., 2001), social networks (Zywiak, Longabaugh, & Wirz, 2002), social comparison (Allan & Gilbert, 1995) and psychotic symptoms (Kay et al., 1987).

5.1.2.1 Marijuana Effect Expectancy Questionnaire – MEEQ (Aarons, Brown, Stice & Coe, 2001)

The 48- item version of the Marijuana Effect Expectancy Questionnaire (Aarons et al., 2001) provides information for cannabis expectancy across six different domains, with three subscales relating to positive expectancy and three sub-scales measuring negative expectancy. The three positive expectancy sub-scales comprise; relaxation and tension reduction, social and sexual facilitation, and perceptual and cognitive enhancement. The negative expectancy sub-scales assess cognitive and behavioural impairment, global negative effects, and craving and physical effects. The measure is adapted from the original 78- item version of the scale (Schafer & Brown, 1991), and demonstrates good internal consistency, high to moderate test-retest reliabilities (0.82 – 0.66), as well as positive (0.21 – 0.56) and statistically significant two year temporal stability coefficients (Aarons et al., 2001). The short 48 item version of the scale used in this study has been validated for use with cannabis using psychiatric inpatients (Guillem et al., 2011), as well as drug treatment populations (Galen & Henderson, 1999). The measure can also be used to assess cannabis expectancy in people with no history of cannabis use (Aarons et al., 2001).

5.1.2.2 Brief Important People Inventory – (BIPI; Zywiak, Longabaugh, & Wirz, 2002)

This measure is a short form version of the Important People and Activities Inventory (Clifford, Longabaugh & Beattie, 1992). The Brief Important People Inventory was developed using the indexes from the original scale that had the strongest relation to later treatment outcome for alcohol (Zywiak et al., 2002). The measure was adapted for use in

this study by changing the wording from alcohol to cannabis. The BIPI yields 6 indexes from the original 11 of the Important People and Activities Inventory, and includes: the total number of people in the persons network, the level of contact with the network, the level of cannabis use by network members, the frequency of cannabis use by network members, and the percentage of heavy cannabis users, abstainers and ex-cannabis users in the network as perceived by the participant. The measure assesses heavy use of cannabis within the social network from the perspective of the participant rather than using pre-defined criteria (i.e. 'heavy cannabis use' by social network members is based upon the participants' perception of what comprises heavy use of cannabis).

The measure has been used with drug users in treatment (Copello, Williamson, Orford & Day, 2006) and various adaptations of the measure have been widely used to provide information regarding general and substance-specific types of support (Jason et al., 2006; Majer et al., 2002; Longabaugh, Wirtz, Zywiak & O'Malley, 2010).

5.1.2.3 Social Comparison Scale – (SCS; Allan & Gilbert, 1995)

The social comparison scale (Allan & Gilbert, 1995) is based upon a semantic differential approach to assess judgements of self perceived social rank, attractiveness and group fit in relation to other people. The 11 item scale uses a bipolar likert scale response format ranging from 0 to 10. Lower scores indicate general inferiority (low rank) self-perceptions. The Cronbach's alpha reported by Allan and Gilbert (1995) was 0.91 among students and 0.88 among clinical populations, and the scale has demonstrated high reliability within a number of studies (O'Connor et al., 2002; Gilbert, Allan, Brough, Melly & Miles, 2002; Gilbert & Allan, 1998).

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

The Positive and Negative Syndrome Scale (PANSS) is a standardised evaluation tool for the signs and symptoms of schizophrenia. The scale is a comprehensive, trained-clinician led structured interview used to assess the positive, negative and general psychopathology of schizophrenia.

Training on how to administer the PANSS was provided by a specialist NHS service for first-episode psychosis. Training involved the assessment of psychotic symptoms of patients in training videos, followed by observation of experienced clinicians completing the PANSS interview with first-episode psychosis patients. Finally, in order to ensure that satisfactory levels of inter-rater reliability were established, the PANSS assessment was administered in conjunction with experienced clinicians and the scale was then independently scored.

Further information for this scale is provided in chapter 4, pp. 66.

5.1.3 Procedure

Multidisciplinary mental health teams at the Early Intervention Service for psychosis were made aware of the nature and requirements of the research though presentations at team meetings. All new referrals to the service were screened by the researcher to identify patients eligible to take part in the study. Patients that met the inclusion criteria were contacted by their key-worker who explained the purpose and requirements of the research and provided written information for the study. If the individual expressed an interest in

taking part in the project they were contacted by the researcher who provided further information for the study, and a meeting was arranged to take written informed consent and complete the baseline interview. Interviews were conducted either in a hospital / health care setting or in the participants own home, and took approximately one hour to complete.

The follow-up assessment for the study was scheduled to take place six months after the baseline interview. Prior to follow-up the researcher first contacted the relevant key-worker to ensure the participant was mentally well enough to take part and was not experiencing severe florid psychotic symptoms. The participant was then contacted by the researcher via telephone or letter and invited to take part in the second interview. The interview involved completing the same assessment that was administered as part of the baseline interview. The researcher had no contact with the participant in the intervening period between assessment at baseline and follow-up at six months.

Ethical approval was obtained a copy of the ethical approval letter is provided in appendix I. A copy of the participant information sheet and consent form used as part of this research is provided in appendix II.

5.1.4 Data Analysis

All data was analysed using SPSS version 18 statistical software. The exact significance values are reported for each statistical analysis, and an alpha level of 0.05 was used for all statistical tests.

Hypotheses 1, 2 & 3

In order to examine hypotheses one, two and three, current cannabis users were compared to participants that had stopped or had no history of cannabis use for the level of cannabis expectancy and perceived social status. This was done using one-way analysis of variance (ANOVA) with planned comparisons. The social network data was analysed using Kruskal-Wallis tests, as data was non-normally distributed and continued to have a non-normal distribution following log-transformation. Significant main effects were investigated using Mann-Whitney tests, with significance values adjusted using bonferroni correction.

Hypothesis 4

Pearson's correlation was used to examine hypothesis four that predicted higher levels of cannabis use would be associated with greater severity of positive psychotic symptoms. The data for positive psychotic symptoms was corrected for positive skew using log-transformation and was normally distributed following this. The total level of cannabis use was calculated by multiplying the number of cannabis use days per week by the amount of cannabis used per day. The level of cannabis use was then correlated with the level of psychotic symptoms.

Hypothesis 5

Repeated measures mixed ANOVAs were used in order to test hypothesis five that predicted there would be a greater improvement in positive symptoms for participants that had stopped or had no history of cannabis use compared to participants with continued cannabis use. The data for psychotic symptoms was corrected for positive skew using log-transformation and was normally distributed following this. The three participant groups

(cannabis users, abstainers and participants that had stopped) were compared for the amount of change in psychotic symptoms during the first six months after entry to treatment.

All effect sizes were calculated by hand, and are denoted by either the italicised letter *r* or *w*. Effect sizes cannot be calculated for analyses using mixed ANOVA designs that compare more than three groups, therefore effect sizes are not provided for the analysis in relation to testing hypothesis 5.

5.2 Results

5.2.1 Participants

Current cannabis users (n= 22), participants that had stopped using cannabis (n= 20) and participants with no history of cannabis use (n=19) completed the baseline assessment at entry to treatment to the Early Intervention Service. The sample was predominantly male (n= 39, 63.9%), with a mean age of 23.62 (±4.33). There were no significant differences between participant groups for age [$F(2, 58)= 1.621$, $p = 0.20$] or gender [$\chi^2(2)= 1.544$, $p = 0.47$]. Information for the rate of refusal is not available for this study.

5.2.2 Participant attrition

At assessment at six months the sample comprised 19 participants using cannabis, 18 participants that had stopped using cannabis, and 18 participants with no history of use. The overall rate of attrition for the three participant groups between assessment at baseline and assessment at six months was 9.84% (n= 6). There were no significant differences in the rate of attrition between participant groups [$F(2, 58)= 0.389$, $p = 0.68$].

5.2.3 Cannabis use

Current cannabis use was defined as any use of cannabis within the last three months. At treatment entry twenty-two participants reported the use of cannabis. The frequency of use was defined as the number of days per week that cannabis was used, the quantity of use was defined as the number of 'joints' used per day. At entry to treatment the mean quantity of cannabis use was 3.05 (± 2.37) 'joints' per day, with a mean frequency of use of 2.48 (±

2.47) days each week. The individual frequency of cannabis use within the sample ranged from 0.04 days per week to the use of cannabis on a daily basis, the quantity of cannabis use ranged from 0.14 to 10 'joints' per day. At assessment at six months 15 of the 19 participants that completed assessment reported use of cannabis, with a mean of 3.27 (± 1.79) 'joints' smoked per day, 2.57 (± 2.49) days per week. The individual frequency of cannabis use within the sample ranged from 0.25 days per week to daily use of cannabis, the quantity of cannabis use was found to range between 1 and 8 'joints' per day.

5.2.4 Hypothesis 1: Cannabis use expectancy

It was hypothesised that participants that had stopped or had no history of cannabis use would have greater negative cannabis expectancy and less positive cannabis expectancy compared to current cannabis users.

In line with the predicted hypothesis, the results indicate that there was a significant difference between participant groups for global negative expectancy [$F(2, 58)= 7.667$, $p = 0.001$, $w = 0.39$]. Planned comparisons indicate that participants with no history of cannabis use had significantly greater negative cannabis expectancy compared to current cannabis users [$t(58)= -3.856$, $p = 0.000$, $r = 0.25$], although there were no significant differences between current cannabis users and participants that had stopped using cannabis [$t(58)= -1.212$, $p = 0.23$, $r = 0.14$]. There were no significant differences between participant groups for the other two remaining negative expectancy variables or any of the three positive expectancy variables (see table 5.1).

5.2.5 Hypothesis 2: Social networks

It was hypothesised that current cannabis users would have larger social networks compared to participants that had stopped or had never used cannabis. In contrast to predictions the results indicate that there were no significant differences between participant groups for the size of the social network [$H(2)= 2.33$, $p = 0.31$].

It was also hypothesised that current cannabis users would have significantly more heavy cannabis users and fewer cannabis abstainers within their social network compared to participants that had stopped or had never used cannabis. The results indicate that there were significant differences between the three participant groups for the percentage of heavy cannabis users [$H(2)= 7.37$, $p = 0.02$] and cannabis abstainers [$H(2)= 11.25$, $p = 0.00$] in the social network. Post-hoc, Mann-Whitney tests were used to further examine the results. Significance values were adjusted using bonferonni correction, so that data had to reach a significance of $p < 0.025$. Analysis revealed that compared to current cannabis users, participants that had never used cannabis had significantly fewer heavy cannabis users [$U= 142.50$, $z = -2.65$, $p = 0.01$, $r = 0.41$] and significantly more cannabis abstainers [$U= 85.50$, $z = -3.38$, $p = 0.001$, $r = -0.53$] in their social networks. The results indicate that there were no significant differences between participants that had stopped using cannabis and participants using cannabis in terms of the percentage of heavy cannabis users [$U= 185.00$, $z = -1.14$, $p = 0.26$, $r = -0.18$] or cannabis abstainers [$U= 149.50$, $z = -1.83$, $p = 0.06$, $r = -0.28$] in the social network (see table 5.1).

There were no significant differences between participant groups for the amount of contact with social network members [$H(2)= 1.69$, $p = 0.42$], and all three participant groups were found to have a similar social network composition, with no significant differences in the

percentage of friends, family or treatment contacts in the social network [family: $H(2)= 2.21$, $p = 0.32$; friends: $H(2)= 2.31$, $p = 0.32$; treatment contacts: $H(2)= 3.63$, $p = 0.16$].

5.2.6 Hypothesis 3: Social status

It was hypothesised that current cannabis users would have a higher level of perceived social status (social rank, attractiveness and group fit) compared to participants that had stopped or had never used cannabis.

In contrast to predictions the results indicate that there were no significant differences between participant groups for perceived social rank [$F(2, 58)= 0.166$, $p = 0.84$, $w = 0.15$], group fit [$F(2, 58)= 1.190$, $p = 0.31$, $w = 0.12$], or attractiveness [$F(2, 58)= 0.363$, $p = 0.69$, $w = 0.12$] (see table 5.1).

Table 5.1: Cannabis expectancy, social networks and social status at treatment entry for current cannabis users, ex-cannabis users and participants with no history of use

	Current cannabis use (n=22)	Stopped cannabis use (n= 20)	No cannabis use (n= 19)
Cannabis expectancy (Mean, SD)			
- *Positive expectancy sub-scales*			
Relaxation & tension reduction	3.51 (0.73)	3.06 (0.88)	3.76 (0.48)
Perceptual & cognitive enhancement	3.06 (0.83)	2.92 (0.69)	3.32 (0.44)
Social & sexual facilitation	3.05 (0.66)	2.96 (0.49)	3.05 (0.44)
- *Negative expectancy sub-scales*			
Craving & physical effects	4.00 (0.78)	4.18 (0.79)	3.86 (0.64)
Cognitive & behavioural impairment	3.35 (0.82)	3.63 (0.82)	3.76 (0.48)
Global negative effects	2.72 (0.86)	3.01 (0.85)	3.65 (0.53)**
Social networks (Median, Range)			
Size	4.41 (0- 10.00)	5.00 (0- 10.00)	5.00 (2.00- 12.00)
Contact amount	5.00 (0- 7.00)	5.50 (0- 7.00)	5.75 (1.50 – 7.00)
Network composition			
Family (%)	45.00 (0- 100)	69.05 (0- 100)	44.40 (0- 100)
Friends (%)	8.35 (0- 100)	7.15 (0- 100)	25.00 (0- 100)
Treatment (%)	0.00 (0- 100)	0.00 (0- 28.60)	0.00 (0- 25.00)
Heavy cannabis users (%)	0.00 (0- 40.00)	0.00 (0- 33.30)	0.00 (0.00)*
Cannabis abstainers (%)	55.00 (0- 100)	100 (0-100)	100 (40.00- 100)**
Social status (Mean, SD)			
Social rank	5.46 (1.48)	5.77 (1.77)	5.60 (1.92)
Group Fit	5.00 (1.95)	5.93 (1.86)	5.35 (2.10)
Attractiveness	5.52 (2.02)	6.02 (1.93)	5.59 (2.11)

Note: * $p < 0.05$, ** $p < 0.01$

5.2.7 Hypothesis 4: The level of cannabis use and the severity of psychosis

It was hypothesised that there would be a cross sectional relationship between the use of cannabis and psychotic symptoms, with higher levels of cannabis use associated with increased severity of positive psychotic symptoms. This association was tested at baseline and at assessment at six months using Pearson's correlation.

In contrast to predictions, the results indicate that there was no significant association between the level of cannabis use and the severity of positive psychotic symptoms at entry to treatment [r = -.22, p (one-tailed) = 0.16] or at assessment at six month follow-up [r = .25, p (one-tailed) = 0.15].

5.2.8 Hypothesis 5: Cannabis use and change over time in the level of psychotic symptoms

It was hypothesised that there would be a greater improvement in positive psychotic symptoms during the first six months after entry to treatment for participants that had stopped or had no history of cannabis use compared to participants that continued to use cannabis.

This analysis aimed to examine the effect of longer-term cannabis use vs. longer-term cessation and abstention on change in psychotic symptoms, therefore participants with recent cannabis cessation (i.e. participants that reported the use of cannabis at treatment entry but stopped during the six month study period, n= 4) were excluded from the analysis. The resulting participant groups were i). participants that continued to use cannabis during the six month study period (cannabis use at baseline and six months, n=

15), ii). participants that stopped the use of cannabis prior to study entry (no use at baseline or six months but lifetime use of cannabis, n=18) and iii). participants with no history of cannabis use (n= 18).

First of all, it was observed that all three participant groups significantly improved over the six month period for the level of positive psychotic symptoms [$F(1, 48)= 6.425$, $p = 0.01$] and general psychopathology [$F(1, 48)= 14.091$, $p = 0.000$]. There was no significant improvement in the level of negative psychotic symptoms for any participant group [$F(1, 48)= 3.625$, $p = 0.06$].

In contrast to predictions the results indicate that there were no significant differences between participants that continued, stopped or had no history of cannabis use for the amount of improvement in the positive [$F(2, 48)= 1.939$, $p = 0.15$] or negative symptoms of psychosis [$F(2, 48)= 0.887$, $p = 0.41$], or the level of general psychopathology [$F(2, 48)= 2.501$, $p = 0.09$]. The data also indicates that there was no significant interaction between the use of cannabis and change over time for positive psychotic symptoms [$F(2, 48)= 0.474$, $p = 0.62$], negative psychotic symptoms [$F(2, 48)= 1.326$, $p = 0.27$] or general psychopathology [$F(2, 48)= 0.683$, $p = 0.51$] (see table 5.2).

Table 5.2: Mean PANSS scores at baseline and at six month follow-up assessment for participants that continued, stopped or had never used cannabis.

Psychotic symptoms	Continued cannabis use (n=15) *(Mean, SD)*	Stopped cannabis use (n= 18) *(Mean, SD)*	No cannabis use (n= 18) *(Mean, SD)*
Baseline assessment			
Positive symptoms	14.13 (5.89)	12.39 (4.51)	10.78 (4.71)
Negative symptoms	12.00 (5.03)	15.28 (8.32)	11.28 (2.87)
General psychopathology	31.73 (7.89)	27.83 (8.83)	25. 44 (5.07)
Six month assessment			
Positive symptoms	12.20 (3.69)	10.72 (3.37)	10.33 (3.39)
Negative symptoms	11.33 (3.46)	11. 17 (3.45)	10.83 (3.35)
General psychopathology	26. 20 (7.89)	24.50 (6.32)	23.17 (5.17)

5.2.9 Observed statistical power

The primary aim of this study was to determine the factors that are associated with cannabis use, cannabis cessation and cannabis abstention during the first-episode of psychosis; the examination of cannabis use expectancies were central to this. Therefore the observed power was calculated for any change in the six domains of cannabis expectancy. The results indicate that there was low statistical power to detect significant differences between participant groups, with the exception of global negative effects (94% power). These results are shown in table 5.3.

Table 5.3: Observed statistical power for cannabis use expectancy

Cannabis expectancy subscale	*p*	Effect size (*w*)	Observed power
- *Positive expectancy sub-scales*			
Relaxation & tension reduction	0.17	0.07	37%
Perceptual & cognitive enhancement	0.19	0.17	34%
Social & sexual facilitation	0.85	0.35	7%
- *Negative expectancy sub-scales*			
Craving & physical effects	0.43	0.22	19%
Cognitive & behavioural impairment	0.19	0.14	35%
Global negative effects	0.001	0.39	94%

5.3 Discussion

This study aimed to examine the association of cannabis use, cessation, and abstention to expectancy for cannabis, social networks and social status. The study also sought to examine the relationship between the continued use of cannabis and the severity of psychotic symptoms.

The results indicated that, compared to cannabis users, participants who never used cannabis had significantly greater negative cannabis expectancy; fewer heavy cannabis users and more cannabis abstainers in their social networks. The study found no significant association between the use of cannabis and the symptoms of psychosis when measured over a period of six months after entry to treatment.

In the present study participants with no history of cannabis use were found to have significantly greater negative expectancy compared to cannabis users, although there was a similar level of positive cannabis expectancy between the two participant groups. These findings are similar to results reported in previous research (Aarons et al., 2001; Schafer & Brown, 1991; Simon & Arens, 2007), and suggest that it is not the absence of expected beneficial or positive effects of cannabis that may be influential in preventing cannabis use, but rather an increased expectation of adverse effects that the individual associates with the use of cannabis. Research in the general population suggests that increased negative cannabis expectancy is also associated with the cessation of cannabis use (Aarons et al., 2001), whereas people that continue to use cannabis have been found to have greater positive and less negative cannabis expectancy (Aarons et al., 2001; Simon & Arens, 2007). However, research indicates that this may not be the case among people with

psychosis (Mueser et al., 1995), and in line with this, the current study found no significant differences in cannabis expectancy between participants that had stopped using cannabis and participants that continued to use cannabis.

This study also found that compared to cannabis users, participants with no history of cannabis use had significantly fewer heavy cannabis users and significantly more cannabis abstainers in their social networks. In fact, the study found that cannabis abstainers had no heavy cannabis users in their social network. Research suggests that contact with substance-using peers increases the likelihood of cannabis use initiation, whereas association with non-drug using peers is thought to prevent the use of cannabis (Chabrol et al., 2006), which may explain the present findings. Although these results suggest that cannabis users have a greater number of cannabis using social contacts in their networks, the cross sectional design of this analysis prevents us from determining the direction of causality, and it is possible that contact with other cannabis users occurred after the initiation of cannabis use for participants in this study who used cannabis.

It is interesting to note that there were no differences in the social networks of cannabis users and participants that had stopped the use of cannabis. The cross-sectional nature of this analysis means we are unable to infer causality, however, research in the alcohol field indicates that a greater number of abstainers in the social network is associated with improved outcome (Zywiak et al., 2002), and the addition of just one non-drinker to the social network has been found to significantly increase the likelihood of alcohol abstinence (Litt et al., 2007). In contrast, a higher number of drinkers in the social network is associated with increased risk of relapse (Havassy et al., 1991). Thus the results of the current study may suggest that people with psychosis who stop using cannabis remain in

contact with social networks supportive of continued cannabis use; if this is the case continued association with cannabis users may result in an increased propensity to cannabis use relapse. Therefore in order to promote continued cessation and prevent cannabis use relapse, patients with recent cannabis cessation may benefit from enhanced social network support for abstinence. A number of recent interventions have been developed for this purpose (Galanter et al., 2004; Copello et al., 2002), but the validity of these interventions for use with mental health populations has yet to be established.

The study also aimed to examine the processes involved in social relationships and the association to the use of cannabis in psychosis. The process of social comparison and perceived social status are fundamental for social relationships (Allan & Gilbert, 1995), and are posited as being central in the social difficulties and social avoidance experienced by people with depression (Swallow & Kuiper, 1988). Therefore, it was proposed that differences in social status may underpin the differences in social networks and social functioning between substance using and non-substance using patients found in previous research (Salyers & Mueser, 2001). However, in contrast to predictions the current study found cannabis using patients to have similar self-rated social status to patients that have stopped or have no history of cannabis use. Further research is required to help explicate the processes that may underpin the differences in social functioning between substance using and non-using patients.

Previous research has found the course of substance use to be associated with the severity of positive psychotic symptoms during the first-episode of psychosis, with continued substance use found to impede recovery in positive psychotic symptoms, and the cessation of drug use associated with symptomatic improvement (Turkington et al., 2009; Harrison

et al., 2008; Baeza et al., 2009; Lambert et al., 2005). This study prospectively examined cannabis use and psychotic symptoms over a period of six months after entry to treatment and found no significant association between the continued use of cannabis and the level of psychotic symptoms. Rather, the results indicate that there was a significant improvement in the level of positive symptoms in all participant groups irrespective of cannabis use status. It could be argued that cannabis was not used at a high enough level to adversely impact symptomatology, particularly since evidence suggests there to be a dose-response relationship between cannabis use and psychotic symptoms (Lambert et al., 2005; Linszen et al., 1994, Wade et al., 2007). However, this study also examined if there was an association between the level of cannabis use and the severity of positive psychotic symptoms, with no significant results, therefore this is unlikely to account for the current findings. Furthermore, previous findings regarding the effect of cannabis use on the symptoms of psychosis have been inconsistent, with some studies suggesting that cannabis use is associated with adverse outcome (Addington & Addington, 2007), whilst other studies have failed to find any significant association between the use of cannabis and outcome in psychosis (Peralta & Cuesta, 1992). The results of this study are consistent with the findings from the National EDEN project reported in chapter 4, and suggest that the use of cannabis may not be associated with the severity of psychotic symptoms in first-episode psychosis.

This study furthers our understanding of how cannabis expectancy may relate to cannabis use behaviour in psychosis. This study is also the first to investigate social networks and social status in relation to cannabis use, cessation and abstention in first-episode psychosis. In addition, the design of the study allowed the prospective examination of the relationship

between cannabis use and psychotic symptoms during the first six months after entry to treatment.

This study has several limitations. The severity of cannabis use over time was not assessed. Research that assesses both the course and severity of cannabis use over time may be more appropriate when trying to determine the effect of cannabis use on the symptoms of psychosis; the small sample size in this study precluded this type of research design. The small sample size in this study may also have meant that the analysis was underpowered to detect significant differences between participant groups, especially as the level of observed power to detect differences in cannabis use expectancy was low. However, the effect sizes for differences in cannabis expectancy between participant groups were small and there was no trend significance in the data. Therefore, even with a larger sample size it is unlikely that there would have been significant differences between participant groups. Lastly, it should be noted that data is not available regarding the rate of participant refusal in the current study, and this may have implications for the representativeness of the participant sample.

The results of this study suggest that cannabis use expectancy may differentiate participants that currently use cannabis from participants with no history of use during the early phase of psychosis. These results are in line with the findings from research among individuals with established psychosis (Mueser et al., 1995), suggesting that the results of the current study may be generalisable to patients beyond the first-episode of psychotic illness. However, there is some evidence to suggest that the composition of the social network may change following the first-episode of illness, with a decrease in the size of the social network (Lipton et al., 1981) and an increase in the proportion of patients in the

social network for patients with a longer duration of illness (Albert et al., 1998). Therefore, the results of the current study which suggests that the composition of the social network may be associated with cannabis use and cannabis abstention in early stage psychosis may not be generalisable to patients with long-term psychoses.

This study helps to further our understanding of the factors that may be associated with the use and non-use of cannabis for people with first-episode psychosis. However, data is lacking regarding the factors perceived to influence the initiation, cessation and abstention from cannabis use in FEP from the point of view of the user. It is suggested that the use of qualitative methodology in future research may help to identify the factors that the individual perceives to be motivationally salient for the use and non-use of cannabis.

The results of this study suggest that increased negative cannabis expectancy and association with non-drug using peers are associated with cannabis abstention in first-episode psychosis. Psycho-education regarding the negative effect of cannabis use may therefore help to prevent the use of cannabis in this population. The study also suggests that the composition of the social network may be similar for participants that stop and participants that continue to use cannabis. As association with drug using peers is a risk factor for individual drug use (Kosterman et al., 2000; Coffey et al., 2000), first-episode psychosis patients with recent cannabis cessation may benefit from social network interventions designed to provide support for continued abstinence from drug use.

CHAPTER 6

CANNABIS USE AND ABSTENTION IN FIRST-EPISODE PSYCHOSIS: THE PARTICIPANTS' VIEW

6.0 Introduction

The results of chapter 5 suggest that increased negative expectancy for cannabis and association with non-drug using peers may be associated with abstention from cannabis use during the first-episode of psychosis. The present study aimed to further investigate the factors associated with the use of cannabis, the cessation of cannabis and cannabis abstention using qualitative methods. It was hoped that this would provide insight into a range of factors perceived by the participant to be influential for the use and non-use of cannabis. The use of cannabis has been documented to sharply decline or cease during the first-episode of psychosis (FEP) in the absence of targeted substance use interventions (Harrison et al., 2008; Wade et al., 2006a). This suggests that the use of cannabis is more prevalent in FEP than in other stages of illness, and there is a natural cycle of change during FEP for the use of cannabis. However the motivation for cannabis use in FEP and the mechanisms of changes in use are unclear.

Cannabis typically begins during adolescence and has been demonstrated to be a risk factor for the development of psychosis (Moore et al., 2007), especially if the use of cannabis begins early in adolescence (Areseneault et al., 2002). There is also some evidence to suggest that cannabis exacerbates the symptoms of psychosis (Grech et al.,

2005) and is linked to poorer long-term outcome (Hides et al., 2006; Linszen et al., 1994). The first-episode of psychosis is regarded as a critical period which may determine the long-term course of illness (Birchwood, 1999; Wyatt, 1991), therefore it is important we better understand and treat prognostic factors such as cannabis use that may potentially alter the course of illness and have long-term implications for psychotic outcome.

Understanding the self reported factors thought to promote or inhibit substance use in the general population has long been a focus for research. However there is comparatively little research regarding the factors perceived to be influential for cannabis use, consumption change or cessation in psychosis, and FEP in particular. Consequently the motivational factors for the use of cannabis in FEP are not fully understood. Some research studies indicate that similar factors motivate the use of cannabis (B. Green et al., 2004; Schaub et al., 2008) and cannabis cessation (Addington & Duchack, 1997; Copersino et al., 2006) for individuals with and without co-morbid psychosis. Research in the general population has recently examined the factors influential for cannabis consumption change, with increased use of cannabis by peers, more opportunities to use cannabis and the perceived beneficial effects all found to be important for increased consumption. On the other hand, a change in circumstances, such as loss of employment, or the negative effects of using cannabis were found to promote decreased use (Terry, Wright & Cochrane, 2007). However, the factors responsible for cannabis consumption change in FEP remain to be identified. Research is needed to fully understand the motivational factors for cannabis use, consumption change and cessation in this group.

Despite the high rate of cannabis use in FEP there remains a significant percentage of individuals who have never used cannabis. Research in the general population indicates

that religion, the family and the culture of the school environment lower the level of substance use initiation and are associated with increased likelihood of drug abstention (Bahr, Maughan, Marcos, & Li, 1998; DeWit, Silverman, Goodstadt & Stoduto, 1995; Wallace, Brown, Bachman & Laveist, 2003; Wills, Vaccaro & McNamara, 1992; Wills, Yaeger, & Sandy, 2003). No empirical research has examined the factors perceived to motivate cannabis abstinence in FEP, and understanding the factors thought to promote abstinence may be important for substance use prevention programmes.

Drug use in psychosis is associated with poorer long term outcome, but there is a significant improvement in outcome upon the cessation of cannabis use (González-Pinto et al., 2009; Lambert et al., 2005; Turkington et al., 2009; Zisook et al., 1992), making cessation an important treatment goal. Cognitive behavioural therapy (CBT) and motivational interviewing (MI) are commonly used interventions aimed to reduce and ultimately stop the use of cannabis. However the efficacy of these interventions for use with mental health populations has recently been questioned; evidence from RCT evaluations indicate modest effects in the short term with little to no effect on the use of cannabis in the long term compared to less intensive interventions such as psychoeducation (Edwards et al., 2006) or standard treatment (Baker et al., 2006; Barrowclough et al., 2010). Approaches such as CBT and MI are based upon the individual's motives and expectancies for drug use, therefore it is important we understand the motives that drive the use of cannabis from the point of view of the user, and a re-evaluation of the motivational factors involved in the use of cannabis may be necessary to improve the efficacy of substance use interventions for this group.

Using qualitative methods the present study aimed to examine the factors perceived to motivate abstinence from cannabis, cannabis initiation and maintenance, as well as changes in consumption (increases, decreases and cessation) in first-episode psychosis. It was hoped that this may help elucidate why there is increased prevalence of cannabis use in FEP and identify the mechanisms of drug cessation during this stage of illness. Understanding the factors that influence the use of cannabis during FEP could also help the development of substance use interventions that are more specifically tailored for this population.

6.1 Method

6.1.1 Participants & Procedure

Participants were recruited from a specialised NHS service for first-episode psychosis. This service manages all cases of first-episode psychosis in a catchment area that serves a population of 1.2 million. Two participant groups were recruited using purposive sampling methods; i) current and ex-cannabis users, and ii) people with no history of cannabis use. Medical records were screened in order to identify if the client had lifetime use of cannabis or had no history of cannabis use prior to being approached to take part in the study. The use or non-use of cannabis was then further confirmed using participant self-report at interview.

Participants were informed about the study by their care co-ordinator and were then contacted by the researcher (JLS) where informed consent was obtained. Ethical approval for this study was granted by the Essex NHS research ethics committee (REF: 05/Q0102/44, AM 03).

6.1.2 Measures

Two separate semi-structured interview schedules were developed based on previous research (Terry et al., 2007). For the participants that had used cannabis, the interview schedule was designed to assess several domains of cannabis use behaviour, including dependency, the subjective effects of cannabis, and the effect upon personal relationships. The main section of the interview aimed to explore the context and patterns of cannabis use, in order to understand the perceived reasons for cannabis initiation, maintenance and consumption change. The second interview schedule was designed for use with

participants without any history of cannabis use and aimed to identify the factors perceived by the participant to prevent the initiation of cannabis.

6.1.3 Data Analysis

Interviews were transcribed verbatim and analysed using grounded theory based methods according to Kathy Charmaz (2006). Data from all participants were used to develop the analysis and all interviews (users and non-users) were analysed using the same methods. Grounded theory was chosen as it allows the development of new models that are 'grounded' in the data. This process involved open line by line coding followed by focused and theoretical coding. Open coding involves labelling and defining discrete instances of phenomena and where possible using in-vivo codes. Focused coding helps to condense the data and is more directed, selective and conceptual than open coding, whilst theoretical coding specifies the possible relationships between the categories and helps integrate these categories into an overall theory to explain the data. This process meant that the analysis was grounded in the data and enabled large volumes of data to be explained and synthesized. Constant comparative analysis was conducted at each stage of the process in order to check that the emerging model adequately represented participants' accounts. The aim of constant comparative analysis is to link and integrate categories in a way that captures all instances of variation (Willig, 2008). The data analysis was guided by the interview schedule and the emerging themes were organised according to the reasons for cannabis abstention, initiation, continued use and consumption change. The results are therefore organised according to these categories. Once data analysis was complete one cannabis user and one abstainer (Pt 1 and Pt 20) were re-interviewed and asked to check the final formulation of the data, with no significant changes suggested as a result of this process.

6.2 Results

The results are presented following a description of the sample demographic details. The first section describes the findings from the non-using participant group followed by the findings from the cannabis using group.

6.2.1 Participants

Thirty participants were recruited in total (cannabis users n=18; non-cannabis user group n=12). A further seven participants (20%) declined to take part, there were no significant differences between participants who refused and those who consented to take part in terms of age [$t(35) = 0.435$, $p = 0.66$] or gender [χ^2 (1) = 0.085, $p = 0.77$]. Of the eighteen participants with a history of cannabis use, 10 were current cannabis users and 8 were ex-cannabis users. Current cannabis use was defined as any use of cannabis within the previous three months. Overall the sample was predominantly male (male 73%, female 27%), with a mean age of 25 (± 5.2). White British accounted for 50% of ethnicity, with the main diagnosis being unspecified psychosis (37%). Detailed participant demographic characteristics for cannabis users and non-users are shown in table 6.1.

Table 6.1: Demographic characteristics of cannabis users and cannabis abstainers

Participant Characteristics		
	Cannabis Users (n= 18)	Non-Cannabis Group (n=12)
Age (Mean, SD., Range)	25 ± 4.1, 17-32	27 ± 6.7, 19-37
Sex (Male; Female)	Male 83%, Female 17%	Male 58%, Female 42%
Ethnicity		
White British	50%	50%
Black Caribbean	11%	16.7%
Mixed Caribbean	16.6%	0%
Asian Pakistani	5.6%	16.7%
Asian Indian	0%	16.7%
Asian Bangladeshi	5.6%	0%
Black African	5.6%	0%
Black Other	5.6%	0%
Religion		
Christian	22.2%	33.3%
Muslim	11.1%	16.7%
Sikh	0%	16.7%
Other	22.2%	25%
Not known/ Not applicable	44.5%	8.3%
Diagnosis		
Unspecified Psychosis	33.2%	41.7%
Schizophrenia	27.8%	33.3%
Schizo-Affective Disorder	11.1%	8.3%
Drug Induced Psychosis	11.1%	0%
Paranoid Psychosis	5.6%	0%
Not known	11.2%	16.7%

6.2.2 Data Analysis

The following section details the themes that emerged as part of data analysis. Thematic sub-headings are highlighted at the beginning of each section and are presented in italics, illustrative participant quotes are presented in italics and double speech marks.

6.2.2.1 Reasons for cannabis abstinence- "I won't take the risk"

Overall various factors were perceived to promote abstinence from cannabis for participants with no history of cannabis use. The reasons for abstention from cannabis use

included the potential negative impact of cannabis to the family, as well as religious and health implications. Participants also discussed the potential adverse effect of cannabis use on mental health, although due to the design of the study it is unclear if these concerns only became apparent after the onset of illness.

Cannabis use was perceived to affect general health, with concerns regarding addiction, the "negative effects of smoking" (Pt 20, 278), as well as impairments to cognition;

> *"I think there may be longer term effects of memory loss with cannabis use" (Pt 23, 283-284).*

Cannabis use was also believed to have a detrimental effect on the family in general;

> *"I would be worried about what the family would say, they'd think that was the limit, they'd say what are you doing with your life, it'd be awful" (Pt 26, 156-158),*

... as well as the social standing of the family in the local community, and this helped promote abstention;

> *"in my culture if someone finds out that I've been using cannabis and people hear of it they'll think about my parents as well, how they've raised me and what kind of parents I've got" (Pt 21, 192-195).*

The perceived adverse effect of cannabis on the reputation of the family was closely linked to the Sikh and Islamic faith. Religion was also perceived to be a salient factor for cannabis abstention for the same cohort of participants, as the use of any intoxicant is proscribed in the Sikh and Islamic faith;

"you're not allowed it in our religion to take drugs and stuff so I'd be scared about the hereafter, what's going to happen in the hereafter when I die" (Pt 25, 95-97).

The potential for cannabis use to cause harm to one's mental health was highly salient in the decision to abstain for this group. The data suggested that the experience of an episode of psychosis influenced the reasons for cannabis abstention, and the potential impact of cannabis on mental health becomes the most salient factor in the decision to abstain following the onset of psychosis. The use of cannabis was believed to affect psychosis in many ways, with cannabis believed to lead to the development of psychosis;

"if I personally used it I know that it would make me go crazy straight away" (Pt 19, 166-167),

... as well as psychotic relapse*;*

"I don't think anyone with mental health issues ought to have it just in case it sort of sets them off again" (Pt 26, 125-126),

... and the exacerbation of psychotic symptoms;

"it can cause all sorts of mental health problems and things and sort of having had them myself I'd be worried it would make it ten times worse or whatever." (Pt 26, 80-83).

6.2.2.2 Reasons for cannabis initiation- "That's how it started like it was more of a social thing than anything else"

The use of cannabis was often perceived to be socially acceptable and was common within the individual's social group. Many participants discussed how they had family members and friends that used cannabis which added to the perception that the use of cannabis was acceptable and 'normal'. The perception of cannabis being the norm was cited to account for the initiation of cannabis;

> *"I was so used to seeing people doing it and it just become normal so I just tried it" (Pt 9, 25-26).*

The use of cannabis was also perceived to be heavily influenced by the individual's peer group, with peer pressure;

> *"Just felt like I had to try and impress them" (Pt 5, 115),*

... and peer influence believed to be responsible for the first use of cannabis;

> *"I started doing it with the first friend come into the picture he used to give me some, give me bits, so he encouraged it because I wouldn't have bought it myself" (Pt 7, 120-122)*

Participant accounts suggest that the use of cannabis within their social group led to an increase in curiosity over the use of cannabis, with curiosity also directly perceived to account for the first use of cannabis;

> *"I just wanted to try it really to see what everyone else was doing…it was curiosity, I just wanted to see what it was like" (Pt 17, 6-7 & 19).*

6.2.2.3 Reasons for the continuation of cannabis- "I do it because I enjoy it but I do it also because all my mates do it"

Social related reasons were again cited to account for the continued use of cannabis, with cannabis used to fit in with friends;

> *"most of the people I knew were associated with drugs and that was the problem I felt as though socially I could go nowhere to avoid the situation, to not take part in this*" (Pt 5, 82-84),

... or to facilitate talking to friends;

> *"I talk more I talk to my friends more as I'm talking I feel more relaxed because I'm talking to people but if I never had the cannabis I think I wouldn't talk that much there's nothing kicking me talking, encouraging me to talk so I think cannabis encourages me to talk." (Pt 18, 88-91).*

It is interesting to note that the use of cannabis to facilitate talking has been suggested to reflect relief from negative psychotic symptoms (Dixon, Haas, Weiden, Sweeney & Frances, 1991). However in the current study participants rarely cited psychosis related reasons to account for the continued use of cannabis. Instead cannabis was perceived to aid relaxation, boredom and coping with stress, which may instead reflect alleviation of general dysphoria;

> *"Yeah boredom and not feeling very well, being depressed and being fed up and I just wanted to not feel so fast and to chill out because I couldn't relax, I couldn't sleep and I found that it [cannabis] helped*

me sleep and there was a lot of reasons... it made me feel better." (Pt 7, 193-197).

Although cannabis was not used for the relief of psychotic symptoms some participants perceived cannabis to help with the label of having psychosis, and this was perceived to influence its continued use;

"it was just a way of forgetting about all of my problems and forgetting about, well although I knew I had psychosis I didn't want to admit it" (Pt 5, 139-141).

6.2.2.4 Reasons for changes in the consumption of cannabis

I. Increased and decreased consumption- "it wasn't that I planned for it to increase..."

The use of cannabis was again influenced by social factors as the level of cannabis use often increased or decreased in accordance with the level of consumption of the peer group;

"friends used to be round all the time they used to smoke loads of it absolutely loads of it and as a result I smoked more and more and more of it" (Pt 7, 60-62).

Other factors perceived to account for both increases and decreases in consumption were related to a change in circumstances, such as pregnancy, loss of employment or a change to one's finances;

"when I lost my job I started to cut down a bit" (Pt 18, 53-54).

II. Decreased consumption & cannabis cessation- "quite a bit of me didn't want it anymore"

The impact of cannabis use on mental health was cited as influential for decreased cannabis use and cessation for a number of participants. The experience of a first episode of psychosis and the association between cannabis and the exacerbation of psychotic symptoms led to the cessation of cannabis for some participants;

> *"I started using it less then because it made me worse to put it simple you know what I mean, it made me scared some of the things I was thinking" (Pt 10, 74-75),*

Cannabis use was also associated with the re-emergence of psychotic symptoms which typically led to decreased consumption and in some cases the cessation of cannabis use;

> *"My old demons started up, Lenard, telling me to hurt people and that, and it was making it worse, making my schizophrenia worse" (Pt 6, 169-170).*

The impact of cannabis use on general health and family relationships, as well as the cost of cannabis were also perceived to be contributory factors in the decision to stop the use of cannabis. For some participants the cost of cannabis was the primary motive for the cessation of cannabis use;

> *"I gave up because of the fact that it was the restriction it was taking a lot out of my money" (Pt 15, 308-309)*

The use of cannabis was also linked to an exacerbation of existing physical health issues for some participants and this was perceived to influence the cessation of cannabis use;

> *"Erm sort of physical health issues that I was having like erm health issues that impacted on my social life and things like that and I thought that the drug itself could be contributing to my health issues so I stopped." (Pt 14, 153-15).*

A number of participants currently using cannabis also discussed the factors that may influence future abstention from cannabis use, with health, mental health, changes in circumstance and religion again perceived to be important. Physical health factors typically related to situations in which the use of cannabis may negatively and irreparably impact the physical health of the participant, mental health related factors were similar to reasons cited by participants that had already stopped using cannabis, such as exacerbating the symptoms of psychosis;

> *"I'll have a drag and then the thoughts get so bad it feels like a bombs just dropped on me all the weight of it, it's not worth smoking man you know what I mean…. Recently it hasn't been like that bad you know what I mean but in the end I do think I'll end up quitting it man because it's just not worth it man, really isn't worth it you know what I mean." (Pt 10, 265-275)*

Many of the factors that were cited to account for the cessation of cannabis use among participant that had stopped using, such as a change to the participants role in the family (i.e. pregnancy/motherhood, marriage) were also cited as potential reasons that may influence the future cessation of cannabis use. Religious reasons for future cannabis

cessation were only cited by individuals belonging to the Sikh or Islamic faith as the use of cannabis is prohibited by these religions;

> *"My religion, I have to stop, like I said you have to be pure to worship Allah, you have to be pure to read the Koran so that's my main reason that I have to stop" (Pt 18, 216-218)*

6.3 Discussion

This study aimed to explore from the participants perspective the factors perceived to be influential in the decision making process of cannabis use or abstention for people with first-episode psychosis. More specifically, it aimed to explore the factors perceived to motivate abstinence, initiation and continued use, as well as consumption change and cessation.

The findings suggest that following the onset of psychosis concern regarding the potential adverse effect of cannabis on mental health is the most salient reason for cannabis abstention. For participants with a history of cannabis use and those still using cannabis the reasons for the use of cannabis appear to be similar to those reported in the general population (Kuntsche & Jordan, 2006; Swift, Hall & Copeland, 2000; Terry et al., 2007), with psychotic related reasons rarely cited as influential for the initiation or continued use of cannabis. Regarding decreased use of cannabis and cannabis cessation, it appears that the experience of psychosis motivates the cessation of cannabis for some people, again as a result of concern over the potential adverse effect of cannabis on mental health. Nevertheless, a number of individuals continued to engage in the use of cannabis following the onset of psychosis and it is these individuals that may benefit from targeted intervention efforts.

For participants that never used cannabis, the results indicate that concerns about the potential of cannabis to cause harm to mental health prevented the use of cannabis following the onset of psychosis. The current results suggest these concerns are highly salient from the participant's perspective and promote cannabis abstinence in FEP in those

who have never used. Mental health factors do not appear to be so influential for drug abstention in non-psychotic populations (DeWit et al., 1995). The design of the study means we are unable to establish if these concerns were present prior to the onset of illness or if it is the experience of psychosis that results in concern regarding the effect of cannabis on mental health. The remaining factors cited to account for abstinence in the current study parallel those documented for the general population (Cleveland, Feinberg, Bontempo & Greenberg, 2008; Costa, Jessor & Turbin, 1999; DeWit et al., 1995). The current findings suggest the influence of family and religion may have inhibitory effects and previous research indicates high levels of religiosity and a cohesive family environment are associated with drug abstinence and lower levels of drug use (DeWit et al., 1995; Wallace et al., 2003). In the current study the belief that the use of cannabis would damage the social standing of the family was also perceived to influence cannabis abstinence for a number of Muslim and Sikh participants. This may reflect the concept of 'izzat' or respectability important in South Asian culture (Wanigaratne, Abdulrahim & Strang, 2003), and may also relate to the finding that the family is more influential in the prevention of drug use for South Asian youth compared with non-minority ethnic groups (Kim, Zane & Hong, 2002).

In terms of initiation and continued use of cannabis, peer influence has long been known to be an influential factor for cannabis use in the general population (Kuntsche & Jordan, 2006), and the current data indicate that social factors also motivate cannabis use in FEP. Social isolation is thought to be an aetiological factor for drug use in people with psychosis, as drug use may provide access to a social group (Macdonald et al., 2004), and the use of cannabis to facilitate talking has been suggested to reflect relief from negative psychotic symptoms (Dixon et al., 1991). In the current study the social aspects of

cannabis use, such as peer influence, peer pressure and the use of cannabis for social facilitation, were found to motivate cannabis initiation, continued use and consumption change. These findings lend further support for the motivational role of the social network in the use of cannabis.

The high prevalence of cannabis use in psychosis has been postulated to result from attempts at the self-medication of psychotic symptoms. According to the self-medication theory (Khantzian, 1997) substances are used based on their ability to relieve specific psychotic symptoms; however this theory has received little empirical support (Mueser et al., 1998). The present results appear to indicate that cannabis was not used for the amelioration of specific positive psychotic symptoms, but rather to cope with general negative affect, although it may be that there is some overlap between general negative affect and the experience of psychosis (Birchwood, Iqbal & Upthegrove, 2005). Psychosis is associated with increased incidence of general dysphoria, and this dysphoria can be extremely heterogeneous comprising various affective states. The present results indicate that persistent use of cannabis in FEP may result from attempts at the alleviation of such dysphoric states, in this case boredom, stress and for relaxation. Research also documents similar affective states to motivate cannabis use in the general population (Boys et al., 1999), although the use of cannabis to respond to negative affect may be especially salient in FEP due to increased levels of dysphoria.

Psychosis specific factors were however influential for decreased use of cannabis and cannabis cessation. Concern regarding how the use of cannabis may adversely affect mental health was found to be motivationally salient for a number of participants

following the onset of psychosis. This is in contrast to reasons typically stated as influential for drug use change in the general population (Terry et al., 2007).

The results of this study suggest that the self-medication of positive psychotic symptoms may not be salient in motivating the use of cannabis; this supports the findings from other studies among people with first-episode psychosis (Pencer & Addington, 2008) as well as the results of research that has examined reasons for use among people with long-term psychosis (Addington & Duchak, 1997). In this study concern regarding the impact of cannabis use to mental health was a salient reason for the cessation of cannabis use. However, evidence suggests that most change in the use of cannabis occurs during the first 2-3 years following the onset of psychosis (Gonzáles-Pinto et al., 2011), thus it is possible that the cessation of cannabis use during the first-episode of illness is motivated by different factors compared to the cessation of cannabis use after the first-episode of illness. Future research is required in order to investigate this hypothesis.

Evidence suggests limited efficacy for psychosocial interventions for substance use in psychosis (Cleary et al., 2008) which may in part be due to a failure to fully understand the motivational mechanisms of substance use in psychosis. This research represents an initial step in understanding the factors thought to influence the use of cannabis in first-episode psychosis from the participant's perspective, and so may have some clinical utility for substance use interventions for this population. The results indicate that the continued use of cannabis in FEP may be due to increased levels of dysphoria and to facilitate social interaction. Therefore interventions targeted to this effect may be more efficacious in reducing the level of substance use for this group. Indeed other authors have also

suggested interventions should focus on social skills training and reducing negative affect in order to combat substance use in psychosis (Schofield et al., 2006).

This study offers insight into the factors perceived to be associated with the use and non-use of cannabis during the first-episode of psychosis, although the qualitative nature of this study means we are unable to generalise the findings to all first-episode psychosis patients. It should also be noted that the retrospective design of the study may have influenced the accuracy of participants self reports, which could be subject to recall bias and memory limitations. This is an inherent problem of all retrospective research and prospective research paradigms can help address this potential confound. In order to further understand the reasons for the use of cannabis in psychosis, prospective longitudinal research is required that compare motivation for cannabis in people with and without co-morbid FEP.

This study contributes to our understanding of the use of cannabis in FEP; specifically the factors perceived to motivate abstinence, the initiation and continued use of cannabis, as well as cannabis consumption change. The study is the first to investigate the motivational factors for cannabis abstention in FEP and the results indicate that the potential for cannabis to cause harm to mental health is a salient factor preventing the initiation of cannabis following the onset of psychosis. The factors involved in the use of cannabis were similar to those documented in the general population, although if may be that individuals with FEP use cannabis more often for the purpose of socialisation and due to increased levels of dysphoria. In light of these findings substance use intervention and prevention programmes in first-episode psychosis may have improved success if the potential harms to mental health are emphasised. Other important targets for intervention include promoting alternative ways of responding to dysphoric states and building non-cannabis using social networks.

CHAPTER 7

MOTIVES AND THE COURSE OF CANNABIS USE FOR PEOPLE WITH AND WITHOUT CO-OCCURRING FIRST-EPISODE PSYCHOSIS

7.0 Introduction

The results of chapter 6 suggest that mental health related reasons may not be a significant motivating factor for cannabis use among young people with first-episode psychosis. In order to test this further it is necessary to compare the motives for cannabis use using a control group of people without psychosis; this is something which is lacking from the current literature.

For the purpose of this study motives for cannabis use were defined as comprising of two factors; namely the *reasons* for using cannabis, and cannabis *expectancy*. Reasons for cannabis use and cannabis expectancy have been posited as aetiological factors in the development of substance use (Cooper et al., 1992; Stacey, 1995; Newcomb et al., 1988) and so a greater understanding of the motives for cannabis use is likely to enhance current intervention efforts.

The most commonly cited reasons for the use of cannabis cited among people with psychosis include the enhancement of positive affect, relief of negative affect and for the purpose of social facilitation; whereas the use of cannabis for the relief of psychotic

symptoms or medication side effects is much less commonly reported (Schofield et al., 2006; Spencer et al., 2002; Addington & Duchak, 1997; Dekker et al., 2009). These reasons for use appear to be similar to reasons for cannabis use reported in the general population (Lee et al., 2007; Simons, Correia, Carey & Borsari, 1998). Studies that have directly compared reasons for use among people with and without psychosis provide further support for this, although they do suggest that cannabis may be more often used to alleviate general dysphoria and negative affect among people with psychosis (B. Green et al., 2004; Schaub et al., 2008; Pencer & Addington, 2008). However, there has been no empirical study of the reasons for cannabis use among people with and without psychosis in a UK patient population, and only one study (Pencer & Addington, 2008) has examined the reasons for cannabis use during the first-episode of psychosis.

Cannabis use expectancies, defined as the effects expected to occur following the use of cannabis have been extensively examined among the general population, and have been found to be associated with the level of cannabis use (Aarons et al., 2001; Galen & Henderson, 1999; Gaher & Simons, 2007; see chapter 2 for a review). The limited research available for people with psychosis suggests that cannabis expectancy may be predictive of recent cannabis use as well as the presence and severity of dependence (Hides et al., 2009). There is also some evidence to suggest that cannabis use expectancy may be similar for people with and without psychosis (Dekker et al., 2010), however this evidence is derived from the use of implicit measurement techniques and visual analogue scales developed by the study authors to assess cannabis expectancy rather than using standardised measures; this methodological shortcoming limits the interpretation of the findings.

Many of the most widely used psycho-social interventions for substance use, such as cognitive behavioural therapy (CBT) and motivational interviewing (MI) are based upon the individual's motives for use. These approaches appear to be less successful for people with psychosis compared to the general population, although the reason for this is unclear (Stephens et al., 2000; Jungerman et al., 2007; Cleary et al., 2008; Edwards et al., 2006; Haddock et al., 2003). Research comparing motives for cannabis use between psychotic and non-psychotic populations may help improve the efficacy of substance use interventions by identifying and directly targeting the cognitive motivational factors that the individual perceives to underpin continued substance use.

In addition to considering individual factors such as motives as an explanation for cannabis use behaviour among young people with psychosis, it is also important to understand the social context of cannabis use. There is some preliminary evidence to suggest that there may be differences in the social networks of cannabis users with and without psychosis. Research has found the level of psychopathology among substance users to be inversely related to the size of the social network (Westermeyer & Neider, 1988), suggesting that substance users with psychosis may have a reduced social network. This finding could relate to increased social isolation among people with psychosis, which has been posited as an aetiological factor for substance use in this population (Drake et al., 2002). Research in the general population suggests that a larger social network may be associated with improved outcome for alcohol use (Zywiak et al., 2009), and the composition of the social network may also be important with an increase in the number of alcohol abstainers in the social network associated with better outcome (Zywiak et al., 2002). On the other hand the inclusion of drinkers in the network has been found to increase the risk of relapse (Havassy et al., 1991). To date, no research has compared the

social networks of substance users with and without psychosis. Comparison of key social-network variables, such as network size and composition may help to further our understanding of the role of the social network in the use of cannabis, which could help to inform the development of tailored substance use interventions.

As reviewed in chapter 5, in order to comprehensively understand the social context of cannabis use it is important to consider the process of social comparison, which involves judgements of social rank, attractiveness and group fit (Allen & Gilbert, 1995). There is evidence to suggest that there is an inverse relationship between the level of psychopathology and perceived social status (Furnham & Brewin, 1988; Gilbert & Allan 1988; Swallow & Kuiper, 1988) and data from animal studies suggest that substance use may be associated with a higher level of social subordination (Harber et al., 1981). It is therefore proposed that individuals with substance use and psychosis may be at greater risk of lower perceived social status, however at present there is no data to support this hypothesis.

As well as understanding the motives and psycho-social factors for cannabis use during the first-episode of psychosis it is also important to understand the course of cannabis use during the early stage of illness. The course of substance use has been found to impact on longer-term outcomes for illness, with continued substance use resulting in poorer long term outcome during the first-episode of psychosis, whereas the cessation of substance use has been associated with improved outcome (Turkington et al., 2009; Lambert et al., 2005; González-Pinto et al., 2011). This is similar to the findings reported in the National EDEN project (chapter 4), where the continued use of cannabis was found to impede recovery in functioning, and the cessation of cannabis use was associated with a significant

improvement in functional outcome. This suggests that cannabis use may be a prognostic factor for outcome in psychosis; in light of this it is important to understand the course of cannabis use during the early stage of psychotic illness.

Previous research suggests that the first-episode of psychosis is a period of significant decline in the level of substance use (Harrison et al., 2008; Turkington et al., 2009), with the greatest declines occurring during the first few years of illness (Addington & Addington, 2007; González-Pinto et al., 2011). Interestingly there is also evidence that a significant reduction in the use of cannabis may occur following the onset of psychosis and after first contact with mental health professionals, but prior to engagement with specialist psychiatric services (Dekker et al., 2008). It is possible that the experience of psychosis causes some patients to reassess their substance use behaviour, and the onset of first-episode psychosis may precipitate the cessation of substance use, at least for a number of patients. The early stage of psychosis may therefore provide an opportunity to promote even greater change in substance use, especially as the rate of substance use appears to be relatively stable among people with more established psychoses (Margolese et al., 2006). However, studies that have examined change in substance use during the first-episode of psychosis have typically used binary categorical classifications of use / non-use and have rarely examined change in the frequency or quantity of use or other indices of consumption such as the level of dependence or drug related problems, despite the fact that this information is likely to be clinically important for treatment. It is also unclear how change in the use of cannabis among people with psychosis compares to change in cannabis use among people without psychosis; this information may also be important in enhancing interventions for substance use for people with psychosis.

Although the early phase of psychotic illness appears to be associated with a significant decline in substance use for some patients, studies suggest that a significant proportion of patients will persist in their use of drugs (Lambert et al., 2005; González-Pinto et al., 2011; Wade et al., 2006a). Thus the identification of factors that have predictive validity for change in substance use is especially important. The level of motivation or readiness to change has been found to have good predictive validity for substance use outcome in the general population (Heather, Rollnick & Bell, 1993; Heather & Hönekopp, 2008). There is also some evidence to suggest that the severity of substance use at first presentation to mental health services may be predictive of the rate of future decline in the level of substance use (Greig et al., 2006; Lambert et al., 2005), although other research has failed to support this finding (González-Pinto et al., 2011). The identification of factors that have predictive validity for change in substance use may enhance the early detection and treatment of people at risk for persistent and potentially problematic use of cannabis.

The current study aimed to identify if the reasons and expectancy for cannabis use were similar for people with and without psychosis, and to understand if cannabis users with and without psychosis differ in respect of their social networks and perceived social status. In addition, the study aimed to prospectively compare the course of cannabis use by examining changes in the frequency and quantity of cannabis use, the level of dependence and cannabis related problems between participants with and without psychosis over a period of six months. In order to maximise the potential to assess change in the use of cannabis among people with psychosis the study was designed to assess cannabis use following entry to treatment to either drug services (for participants without psychosis) or the Early Intervention Service for psychosis (for participants with co-occurring psychosis) as research indicates that the early stage of first-episode psychosis is associated with the

greatest amount of change in substance use (Addington & Addington, 2007; Dekker et al., 2008).

The study aimed to test four hypotheses:

I. At presentation to treatment, participants with and without psychosis will report similar motives (reasons and expectancy) for cannabis use.

II. At presentation to treatment cannabis users with psychosis will have a significantly smaller social network (i.e. fewer social contacts identified) and lower perceived social status (i.e. lower social rank, attractiveness and group fit) compared to cannabis users without psychosis.

III. At six month follow-up after entry to treatment both participant groups will have significantly reduced the quantity and frequency of cannabis use, the level of dependence and the level of cannabis related problems.

IV. The level of cannabis use and readiness to change at treatment entry will predict cannabis use outcome (continued use or cessation) at six month follow-up for both participant groups.

7.1 Method

7.1.1 Participants

Participants with psychosis were recruited from a specialised service for first-episode psychosis (EIS). This service manages all cases of first-episode psychosis within a catchment area that serves a population of 1.2 million. Recruitment of participants without co-occurring psychosis involved five community drug teams from statutory and non-statutory drug services . Participants with and without psychosis were recruited ensuring that the two participant groups were matched in terms of age and gender, in order to ensure that there were no significant age or gender differences between the participant groups the data was regularly checked using independent samples t-tests and Chi-square tests. Recruitment was based upon consecutive admissions to treatment in order to ensure all participants were new clients to either mental health treatment (EIS) or drug services.

Inclusion criteria for the study required participants to be new clients entering treatment and aged between 18 and 35 years. Participants were only eligible to take part if they reported current use of cannabis, and cannabis was required to be the primary drug of use with at least one occasion of use within the last three months. Participants were excluded from the study if they were unable to provide written informed consent, or it was felt by the clinical team that the individual was too mentally unwell to participate (i.e. if it was felt that the client was experiencing severe florid psychotic symptoms).

7.1.2 Measures

The assessment measures were completed by both participant groups upon entry to treatment and after a period of six months. Information for some of the measures has been presented in detail in previous chapters and for these measures the reader is asked to refer to the relevant chapter. All participants were required to complete measures of cannabis use (Kavanagh et al., 1998, see chapter 4, pp. 63), cannabis dependence (Gossop et al., 1995, see chapter 4, pp. 64), reasons for cannabis use (Spencer et al., 2002), cannabis expectancy (Aarons et al., 2001, see chapter 5, pp. 93), and motivation to change (Rollnick, Heather, Gold & Hall, 1992). Social comparison (Allen & Gilbert, 1995, see chapter 5, pp. 94) and the social network (Zywiak et al., 2002, see chapter 5, pp. 93) were also assessed for each participant group.

7.1.2.1 The Drug Motivation Questionnaire- (Spencer, Castle & Michie, 2002)

This 34-item questionnaire provides information relating to five different reasons for cannabis use; namely enhancement, coping, social, conformity, and coping with psychotic symptoms. The measure is based on Coopers (1994) Drinking Motives Questionnaire and was adapted by Spencer et al. (2002) to include an additional 17 items to measure cannabis use for psychotic related reasons. The resulting 34 item measure is scored on a five point scale.

7.1.2.2 Readiness to Change Scale - (RTCQ; Rollnick, Heather, Gold & Hall, 1992)

The RTCQ is a 12 item likert scale questionnaire based on Prochaska & DiClemente's (1986) stages of change model. The questionnaire provides an indication of the level of

motivation for substance use change, with responders classified as being at the precontemplation, contemplation or action stage of change. The scale is scored on a five point response scale ranging from strongly disagree (-2) to strongly agree (+2), with allocation to the stage of change based upon the highest scale score.

The scale was developed for use with people using alcohol at excessive levels, and has been found to have satisfactory levels of internal consistency for the three sub-scales or 'stages' (precontemplation = 0.73; contemplation = 0.80; action = 0.85), good test-retest reliability (precontemplation = 0.82; contemplation = 0.86; action = 0.78) with the three factor structure found to account for 68.6% of the variance (Rollnick et al., 1992). The measure has also been adapted for use with cannabis users with satisfactory levels of internal consistency (Edwards et al., 2006; Litt, Kadden, Kabela-Cormier & Petry, 2008). The cannabis use version of the scale was used in the current study.

7.1.3 Procedure

Clinicians at the study sites were made aware of the nature and requirements of the research though presentations at team meetings. All new referrals to the Early Intervention Service were screened by the researcher to identify patients eligible to take part in the study. Within the community drug teams this was done by a nominated key-worker at the service with whom the researcher maintained regular contact. Patients identified as eligible to take part in the study were contacted by their key-worker who explained the purpose and requirements of the research and provided an information leaflet for the study. If the client expressed an interest in taking part in the project they were contacted by the researcher who provided further information for the study, and a meeting was arranged to

take written informed consent and complete the baseline interview. Interviews were conducted either in a health care setting or in the participants own home, and took approximately one hour to complete.

The follow-up assessment for the study was scheduled to take place six months after the baseline interview. When the six month follow-up assessment was due, the researcher first contacted the relevant key-worker to ensure the participant was mentally well enough to take part (i.e. the client was not experiencing severe florid psychotic symptoms). The participant was then contacted by the researcher via telephone or letter and invited to take part in the second interview. The interview involved completing the same assessment that was administered as part of the baseline interview. The researcher had no contact with the participant in the intervening period between assessment at baseline and follow-up assessment at six months.

Ethical approval was obtained [redacted] A copy of the approval letter is provided in appendix I. A copy of the participant information sheet and consent form used as part of this research is provided in appendix II.

7.1.4 Data analysis

All data was analysed using SPSS version 18 statistical software. The exact significance values are reported for each statistical analysis, and an alpha level 0.05 was used for all statistical tests. All effect sizes were calculated by hand, and are denoted by an italicised *r*.

Hypotheses 1 & 2

In order to test hypotheses one and two regarding reasons for cannabis use, cannabis expectancy and perceived social status, data were analysed using independent samples t-tests. The social network data was analysed using Mann-Whitney tests as data was non-normally distributed, and continued to have a non-normal distribution following log-transformation.

Hypothesis 3

Differences in the rate of cannabis cessation between participant groups were analysed using Chi-square tests. In order to examine hypothesis three, repeated measures mixed analysis of variance (mixed ANOVAs) were conducted to analyse any change in the level of cannabis use (frequency and quantity), cannabis dependence and cannabis related problems over a period of six months after entry to treatment. Significant interactions were investigated using dependent and independent samples t-tests. The frequency of cannabis use was defined as the number of days per week that cannabis was used; quantity of use was defined as the number of times per day that cannabis was used.

Hypothesis 4

In order to explore hypothesis four, the two participant groups were compared for the total level of cannabis use and readiness to change at entry to treatment using Mann-Whitney

tests. Multiple regression using the forced entry method was then conducted to examine the predictive validity of baseline readiness to change scores and the level of cannabis use for cannabis outcome (continued use or cessation) at six months. The total level of cannabis use was calculated by multiplying the frequency of cannabis use by the quantity of use. The data was found to meet the assumptions of multiple regression, namely the assumption of linearity, homoscedasticity (the residuals at each level of the predictor variables have a similar variance), and no multicollinearity in the data, (i.e. there was no significant correlation between predictor variables). Separate analyses were conducted for participants with and without psychosis.

7.2 Results

7.2.1 Participants

Twenty-two participants with cannabis use and first-episode psychosis (15 male, 7 female) and twenty participants with cannabis use and no psychosis (13 male, 7 female) completed the baseline phase of assessment at treatment entry. The mean age was 24.4 (± 5.06) for cannabis users with psychosis and 24.4 (± 4.9) for cannabis users without psychosis. Participants with and without psychosis were recruited matched for age and gender, and the results support that there were no significant differences between the two participant groups for these variables [age: $t(40)= -0.023$, $p = 0.98$; gender: χ^2 (1)= 0.48, p =0.82]. Information for the rate of participant refusal is not available for this study.

Participants with co-occurring cannabis use and psychosis in this study are the same participant group that were used for comparison with ex-cannabis users and cannabis abstainers in chapter 5. Therefore, the reader is asked to refer to chapter 5 for a description of cannabis use among this participant group.

7.2.2 Participant attrition

The overall rate of attrition was 19.05% (n= 8), with 34 participants completing follow-up assessment at six months (n=19 participants with psychosis, n= 15 participants without psychosis). There were no significant differences in the rate of attrition between the two participant groups [$t(40)= 0.924$, $p = 0.36$]. In cases where attrition had led to missing data at follow-up, baseline data was also excluded if the analysis was based on repeated measures assessment (i.e. in assessing change in cannabis use over time).

7.2.3 Drug use prevalence at baseline

Participants were recruited on the basis of current use of cannabis, defined as any use of cannabis within the previous three months. There were no significant differences between participants with or without psychosis in the rate of other drug use at treatment entry. The prevalence of drug use is reported in table 7.1.

Table 7.1: Prevalence of drug use at treatment entry (baseline)

	Cannabis users with psychosis (n=22)	Cannabis users no psychosis (n= 20)
Cannabis	100%, (n=22)	100%, (n=20)
Sedatives	22.7%, (n=5)	15%, (n= 3)
Cocaine	18.2%, (n= 4)	20%, (n= 4)
Opiates	13.6%, (n=4)	5%, (n= 1)
MDMA	4.5%, (n=1)	5%, (n=1)
Legal Highs	4.5%, (n=1)	5%, (n=1)

7.2.4 Hypothesis 1: Comparison of the motives (reasons and expectancy) for cannabis use

Reasons for cannabis use

It was hypothesised that participants with and without psychosis would report similar reasons for cannabis use.

In line with predictions there were no significant differences between participant groups in the use of cannabis for general enhancement purposes [$t(40)= 0.435$, $p = 0.66$, $r = 0.07$], social reasons [$t(40)= -0.032$, $p = 0.97$, $r = 0.16$], conformity [$t(40)= 0.916$, $p = 0.36$, $r = 0.14$], or psychotic related reasons [$t(40)= -0.965$, $p = 0.34$, $r = 0.15$]. The results indicate that the only significant difference between participant groups was for coping related reasons for cannabis use; participants without psychosis were found to cite a significantly greater level of coping related reasons for cannabis use compared to participants with psychosis [$t(37)= -2.435$, $p = 0.02$, $r = 0.37$]. See figure 7.1.

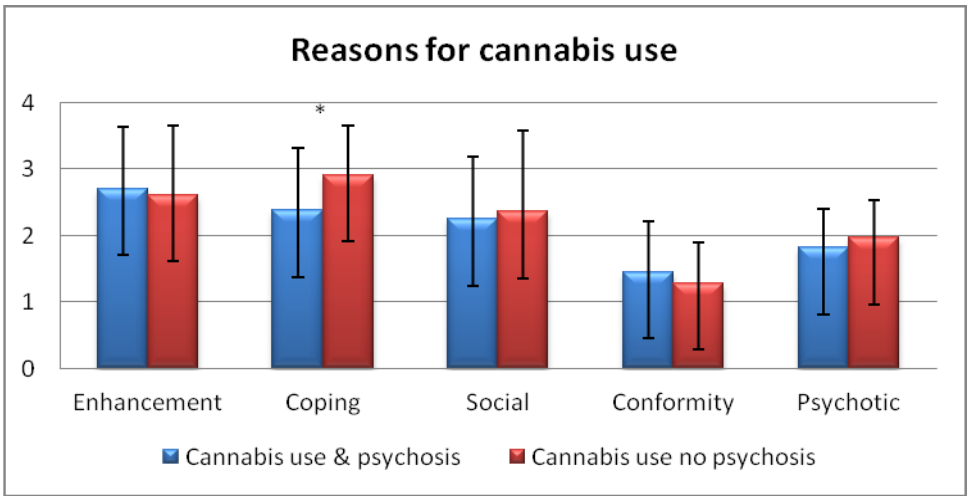

Figure 7.1: Reasons for the use of cannabis

Note: *$p < 0.05$

Cannabis use expectancy

It was hypothesised that participants with and without psychosis would report similar expectancies for cannabis use.

In line with predictions, the results indicate that there were no significant differences in cannabis use expectancy between participant groups, with similar levels of expectancy for relaxation and tension reduction [$t(40)= -1.474$, $p = 0.14$, $r = 0.23$], social and sexual facilitation [$t(40)= 1.161$, $p = 0.25$, $r = 0.18$], perceptual and cognitive enhancement [$t(40)= 0.348$, $p = 0.73$, $r = 0.05$], cognitive and behavioural impairment [$t(40)= 0.177$, $p = 0.86$, $r = 0.03$], craving and physical effects [t(40)= 0.488, P= 0.62, r= 0.08], and global negative effects [$t(40)= 0.002$, $p = 0.99$, $r = 0.32$]. The results indicate that the most common expectancy for cannabis use for both participant groups was craving and physical effects (see figure 7.2).

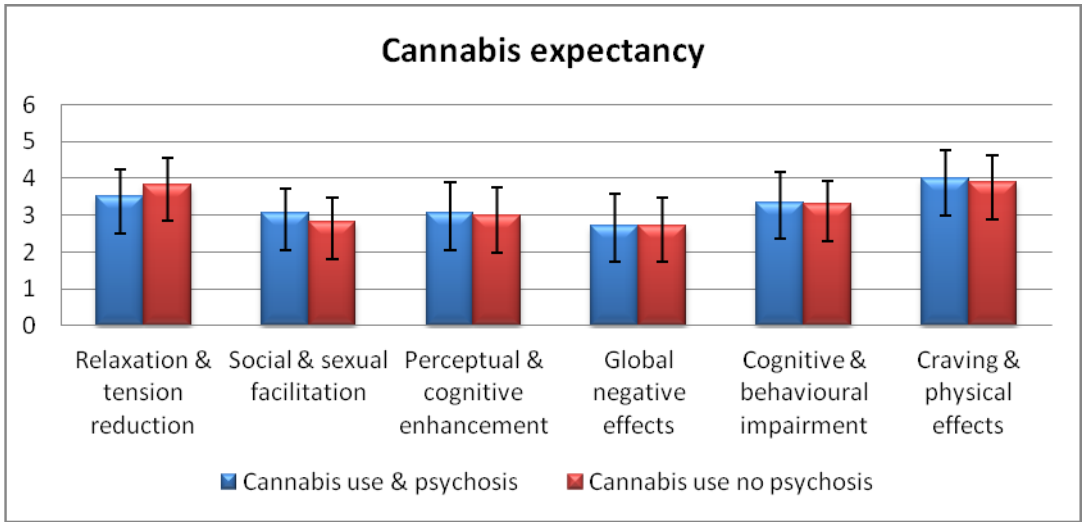

Figure 7.2: Cannabis use expectancy

7.2.5 Hypothesis 2: Social networks

It was hypothesised that cannabis users with psychosis would have a smaller social network compared to cannabis users without psychosis.

In line with predictions, participants with psychosis were found to have a significantly smaller social network [U= 126.50, z = -2.37, p = 0.01, r = -0.37]. The analysis found no significant differences in the amount of contact with network members [U= 175.00, z = -1.14, p = 0.26, r = -0.18], or the composition of the network between participants with and without psychosis [family: U= 183.50, z = -0.92 p = 0.36, r = -0.14; friends: U= 214.50, z = -0.14, p = 0.89, r = -0.02; treatment contacts: U= 218.00, z = -0.74, p = 0.94, r = 0.01], and for both participant groups the social network was found to comprise primarily of family members followed by friends (see table 7.2). There was a trend for participants without psychosis to have a higher percentage of heavy cannabis users in their social network, but this failed to reach significance [U= 152.50, z = -1.84, p = 0.06, r = -0.28]. There were no significant differences in the percentage of cannabis abstainers within the social network [U= 201, z = -0.48, p = 0.63, r = -0.07].

Table 7.2: The social network of cannabis users with and without psychosis

Social Network Variables	Cannabis users with psychosis (n=22) *(Median, Range)*	Cannabis users no psychosis (n=20) *(Median, Range)*
Network size	4.50 (0-10.00)	7.00 (1-10.00)**
Contact with network	5.00 (0-7.00)	5.50 (3.00-7.00)
Network composition (%)		
Family	45.00% (0-100)	53.60% (0-90.00)
Friends	8.35% (0-100)	22.50% (0-62.50)
Treatment contacts	0.00% (0-100)	0.00% (0-33.30)
Heavy cannabis users (%)	0.00% (0-40.00)	17.15% (0-50.00)
Cannabis abstainers (%)	55.00% (0-100)	42.90% (12.50-100)

Note: $^{**}p < 0.01$

7.2.6 Hypothesis 2: Social status

It was hypothesised that cannabis users with psychosis would have a significantly lower level of perceived social status. In contrast to predictions the results indicate that there were no significant differences between participants with or without psychosis for perceived social rank [$t(40)= -1.235$, $p = 0.22$, $r = 0.19$], group fit [$t(40)= -1.457$, $p = 0.15$, $r = 0.22$], or attractiveness [$t(40)= -0.158$, $p = 0.87$, $r = 0.02$].

7.2.7 Change in the use of cannabis over the first six months after treatment entry

The following section aimed to compare change in the use of cannabis for participants with and without psychosis during the first six months after entry to treatment.

7.2.7.1 Cessation of cannabis use

Twenty one percent of participants with psychosis and twenty percent of participants without psychosis were found to stop using cannabis during the six month study period, there were no significant differences in the level of cannabis cessation between participant groups [$\chi^2(1) = 0.006$, $p = 0.94$] (see table 7.3).

Table 7.3: The level of cannabis cessation for participants with and without psychosis

	Cannabis users with psychosis (n= 19)	Cannabis users without psychosis (n= 15)
Cannabis use at baseline	100%, n= 19	100%, n= 15
Cannabis use at six months	78.9 %, n= 15	80.0%, n= 12
Participants that stopped	21.1%, n= 4	20.0%, n= 3

7.2.7.2 Hypothesis 3: Change in the level of cannabis use

The frequency of use was defined as the number of days per week that cannabis was used, the quantity of use was defined as the number of 'joints' used per day. At entry to treatment participants without psychosis used a mean of 4.82 (± 2.91) 'joints' per day, with a mean frequency of use of 5.69 (± 2.03) days each week. The individual frequency of cannabis use ranged from 0.25 days per week to daily use of cannabis among this participant group. At assessment at six months12 of the 15 participants without psychosis that completed assessment reported the current use of cannabis; with a mean of 3.42 (± 1.83) 'joints' per day used 5.33 (± 2.15) days each week. The individual frequency of

cannabis use ranged from 2 days per week to daily use, the quantity of cannabis use per day ranged from 1 to 6 'joints'.

For information in relation to the frequency and quantity of cannabis use among participants with psychosis please refer to chapter 5, section 5.2.3.

Participants with and without psychosis were compared for any change in the frequency or quantity of cannabis use during the first six months after entry to treatment. The two participant groups were also compared for any changes in the level of cannabis dependence and cannabis related problems (see table 7.4). The results of these analyses are detailed below.

Frequency of cannabis use

It was hypothesised that both participant groups would significantly reduce the frequency of cannabis use from assessment at baseline to assessment at six months.

In contrast to predictions there was no significant change in the frequency of cannabis use over time for either participant group [$F(1, 32)= 2.456$, $p = 0.127$, $r = 0.27$]. Overall the results indicate that participants with psychosis used cannabis less frequently than participants without psychosis throughout the six month period [$F(1, 32)= 37.396$, $p = 0.000$, $r = 0.73$], therefore there was no significant interaction between participant group and change in the frequency of cannabis use over time [$F(1, 32)= 3.047$, $p = 0.09$, $r = 0.29$].

Quantity of cannabis use

It was hypothesised that both participant groups would significantly reduce the quantity of cannabis use from assessment at baseline to assessment at six months.

The results indicate that there was a significant overall decrease in the quantity of cannabis use from baseline to six month assessment [$F(1, 31)= 5.790$, $p = 0.02$, $r = 0.39$], as well as a significant difference between participant groups for the quantity of cannabis use [$F(1, 31)= 6.033$, $p = 0.02$, $r = 0.40$], and a significant interaction for change in the quantity of cannabis use and participant group [$F(1, 31)= 4.160$, $p = 0.05$, $r = 0.29$].

Post-hoc tests indicate that the decrease in the use of cannabis was significant for participants without psychosis [$t(13)= 2.419$, $p = 0.03$, $r = 0.56$], but there was no significant change in the quantity of use for participants with psychosis [$t(18)= 0.346$, $p = 0.73$, $r = 0.08$]. Participants with psychosis were found to use less cannabis at baseline [$t(39)= -2.138$, $p = 0.03$, $r = 0.32$], but there was no significant difference between participant groups for the quantity of cannabis use at six months [$t(32)= -0.211$, $p = 0.83$, $r = 0.04$].

Level of cannabis dependence

It was hypothesised that both participant groups would significantly reduce the level of cannabis dependence from assessment at baseline to assessment at six months.

The results indicate that there was a significant overall decrease in the level of dependence from baseline to six month assessment [$F(1, 32)= 6.046$, $p = 0.02$, $r = 0.39$], as well as a

significant difference in the level of dependence between participant groups [$F(1, 32)= 4.735$, $p = 0.03$, $r = 0.36$] and a significant interaction for change in the level of dependence and participant group [$F(1, 32)= 5.564$, $p = 0.02$, $r = 0.38$].

Post hoc-tests indicate that participants without psychosis had a significant decrease in the level of dependence [$t(14)= 2.585$, $p = 0.02$, $r = 0.57$], but there was no significant change in the level of dependence for participants with psychosis [$t(18)= 0.100$, $p = 0.92$, $r = 0.02$]. The results also indicate that participants with psychosis had a lower level of dependence at baseline [$t(40)= -2.657$, $p = 0.01$, $r = 0.39$] but there was no significant difference between participant groups at six months [$t(32)= -1.096$, $p = 0.281$, $r = 0.19$].

Level of cannabis related problems

It was hypothesised that both participant groups would significantly reduce the level of cannabis related problems from assessment at baseline to assessment at six months.

The results indicate that there was a significant overall decrease in the level of problems associated with cannabis use [$F(1, 32)= 7.097$, $p = 0.01$, $r = 0.43$], and a significant interaction for change in cannabis related problems and participant group [$F(1, 32)= 8.674$, $p = 0.00$, $r = 0.46$], but no significant difference between participant groups for the level of cannabis related problems [$F(1, 32)= 0.043$, $p = 0.83$, $r = 0.04$].

Post-hoc tests indicate that there was a significant decrease in the level of cannabis related problems for participants without psychosis [$t(14)= 3.729$, $p = 0.002$, $r = 0.71$], but no

significant change over time for participants with psychosis [$t(18)= -0.213$, $p = 0.83$, $r = 0.05$].

Table 7.4: Cannabis use at baseline and six month follow-up for participants with and without psychosis

	Baseline		Six months	
Cannabis use in the last three months	Cannabis users with psychosis (n=19) *(Mean, SD)*	Cannabis users no psychosis (n=15) *(Mean, SD)*	Cannabis users with psychosis (n=19) *(Mean, SD)*	Cannabis users no psychosis (n=15) *(Mean, SD)*
Frequency of use (days per week)	1.92 (2.10)	6.20 (1.42)***	2.03 (2.44)	4.27 (2.91)***
Quantity of use (number of cannabis 'joints' per day)	2.79 (2.24)	5.36 (2.68)*	2.58 (2.09)	2.71 (2.23) †
Level of dependence	3.95 (3.69)	8.00 (4.21)**	3.89 (4.24)	5.47 (4.03) †
Level of problems	6.11 (6.25)	7.93 (4.48)	6.32 (7.12)	3.73 (3.49)††

* $p< 0.05$, ** $p< 0.01$, *** $p< 0.001$ denote significant differences between participant groups at either baseline or six months.

†$p< 0.05$, †† $p< 0.01$ denote significant changes over time within each participant group.

Hypothesis 4: Factors predictive of cannabis use outcome

It was hypothesised that the level of cannabis use and readiness to change at entry to treatment would predict cannabis use outcome (continued use or cessation) at six month follow-up for both participant groups.

Multiple regression was used to test the hypothesis. The regression model was tested separately for participants with and without psychosis. Prior to regression analysis any

potential differences between participant groups in the predictor variables (readiness to change and total level of cannabis use at baseline) were examined using Mann-Whitney tests.

There were no significant differences between participants with or without psychosis in the level of readiness to change at baseline [U= 156.00, z = -1.74, p = 0.09, r = -0.21], with both participant groups found to be in the 'contemplation stage' of change. The results indicate that at baseline assessment participants with psychosis had a significantly lower level of overall cannabis use compared to participants without psychosis [U= 74.00, z = -3.53, p = 0.000, r = -0.55].

The results of the multiple regression analysis indicate that readiness to change and the level of cannabis use at baseline were not significant predictors of cannabis outcome at six months for participants with psychosis (n=19) [F(2,16)= 0.345, p = 0.71], or participants without psychosis (n=14) [F(2,11)= 0.867, p = 0.45]. The model was found to account for only 4% of the variance in outcome [R^2= 0.040] for participants with psychosis, and 14% of the variance in outcome [R^2= 0.136] for participants without psychosis. This data is presented in table 7.5.

Table 7.5: Readiness to change and the level of cannabis use at treatment entry on cannabis outcome (continued use or cessation) at six month follow-up assessment

	B	SE B	β
Cannabis users with psychosis (n= 19)			
Constant	0.518	0.348	
Cannabis use	-0.003	0.015	-0.052
RTC-C stage of change	0.144	0.191	0.230
Cannabis users without psychosis (n=14)			
Constant	0.869	0.379	
Cannabis use	-0.008	0.006	-0.378
RTC-C stage of change	0.082	0.146	0.163

Note: Cannabis users with psychosis R^2= 0.04; cannabis users without psychosis R^2= 0.14

7.2.9 Observed statistical power

The primary aim of this study was to determine if the motives for cannabis use for people with first-episode psychosis represent psychosis specific reasons vs. 'normal' motivational factors. Therefore the observed power was calculated for any differences in reasons for cannabis use between participants with and without psychosis. The results indicate that there was low statistical power to detect significant differences between participant groups (see table 7.6).

Table 7.6: Observed statistical power for reasons for cannabis use

Reasons for cannabis use	*p*	Effect size (*r*)	Observed power
Enhancement motives	0.66	0.07	6%
Coping motives	0.02	0.37	55%
Social motives	0.97	0.16	6%
Conformity motives	0.36	0.14	12%
Psychotic related motives	0.34	0.15	13%

7.2.10 Summary of findings

The results indicate that there were no significant differences in the reasons for cannabis use between participants with and without psychosis, with the exception of coping related reasons; participants without psychosis were found to use cannabis significantly more for general coping related reasons. There were no significant differences in cannabis expectancy for participants with and without psychosis. The results indicate that participants with psychosis had a significantly smaller social network than participants without psychosis, but there were no significant differences between participant groups in the level of perceived social status.

The results indicate that participants without psychosis significantly reduced the quantity of use, the level of dependence and the level of cannabis related problems, but the frequency of cannabis use remained the same over time. However, participants with psychosis continued to use cannabis at the same frequency and quantity and there were no

significant changes in the level of dependence or cannabis related problems over the six month period.

The results also highlight that despite a significantly lower baseline quantity and frequency of cannabis use among participants with psychosis, there were no significant differences in the level of cannabis related problems between participant groups, with participants with psychosis having a similar level of cannabis related problems to cannabis users without psychosis.

Readiness to change and the level of cannabis use at treatment entry were not associated with the continued use of cannabis or cannabis cessation at six month follow-up in either participant group.

7.3 Discussion

This study aimed to compare the motives for cannabis use, social networks and social status in participants with and without psychosis who were matched for age and gender. The study also aimed to identify if change in the use of cannabis in the first six months after entry to treatment was similar among the two populations.

In line with previous findings (B. Green et al., 2004; Schaub et al., 2008; Pencer & Addington, 2008; Dekker et al., 2010) this study found that participants with first-episode psychosis had similar expectancy for cannabis and used cannabis for similar reasons to participants without co-occurring psychosis. The only significant difference was that participants without psychosis used cannabis significantly more for coping related reasons. The findings suggest that the use of cannabis for people with psychosis in the current study was not motivated by a greater level of mental health related reasons, and supports the assertion that the self-medication of psychotic symptoms may not be a primary motive for the use of cannabis during the early phase of illness (Dekker et al., 2009). These findings also lend further support to the results described in chapter 6, which found that mental health related reasons were not motivationally salient for the use of cannabis for patients with first-episode psychosis.

Social related reasons for drug use and the influence of peer groups in the use of cannabis are well documented (Chabrol et al., 2006; Lee et al., 2007; Schaub et al., 2008; Schofield et al., 2006) and research in the general population suggests that a larger social network may be associated with improved outcome for alcohol use (Zywiak et al., 2009). Despite this however there has been no previous empirical study comparing the social networks of

substance users with and without psychosis. There is some evidence to suggest that the size of the social network may relate to the level of psychopathology among substance users, with increased psychopathology associated with reduced social network size (Westermeyer & Neider, 1988). In line with this, the current study found participants with psychosis to have a significantly smaller social network than participants without psychosis. Research indicates that following the onset of psychosis there may be a loss of contact with social network members (Macdonald et al., 2005), which may explain this finding. The current study found no significant differences between participant groups in social related reasons for cannabis use or expectancy of social facilitation. This suggests that the smaller social network among participants with psychosis is not related to increased social isolation or cannabis use for social facilitation reasons, as previous research has suggested (Drake et al., 2002).

Evidence suggests that the first-episode of psychosis may be a period of significant cessation in substance use (Harrison et al., 2008; González-Pinto et al., 2011). However, research has rarely examined change in the frequency or quantity of use, or indeed the level of substance use dependence over time, and it was unclear how change in substance use might compare between people with and without psychosis. This study is the first to prospectively examine this. The results indicate that participants with psychosis continued to use cannabis at the same frequency and quantity, and there was no change in the level of dependence and cannabis related problems. In contrast, participants without psychosis were found to reduce the quantity of cannabis use, the level of dependence and the level of cannabis related problems. This suggests that people with and without psychosis of similar age and gender may have a different course of cannabis use, with the results suggesting that there may be less change in the use of cannabis for people with co-occurring

psychosis after entry to treatment. However, it is important to note that the modality of treatment differed between the two groups; participants with psychosis primarily sought help for mental health related reasons, whilst participants without psychosis sought help for reasons related to their drug use. It is possible then that this difference in the mode of treatment may have contributed to the differences in the level of change in cannabis use between the two groups. Furthermore previous research has found a significant amount of change to occur in the use of cannabis following the onset of psychosis but prior to engagement with specialist psychiatric services (Dekker et al., 2008). Patients that continue to use cannabis following engagement with services for first-episode psychosis may therefore represent a cohort of patients resistant to change in cannabis use, which might explain why participants with psychosis in this study failed to reduce their frequency or quantity of cannabis use during the six months after entry to treatment. However, an alternative explanation for the findings may relate to the fact that participants without psychosis were using significantly more cannabis at presentation to treatment, and as a result the potential for a reduction in the use of cannabis over time among this group was much greater.

This study also sought to identify variables predictive of later outcome for cannabis use, and to determine if these factors were equally salient for people with and without psychosis. The level of substance use has previously been found to be predictive of later substance use outcome (Greig et al., 2006; Lambert et al., 2005), although this was not the case in the current study, and other research has also failed to provide support for this (González-Pinto et al., 2011). There is evidence that the level of readiness to change is predictive of later substance use outcome (Heather et al., 1993; Heather & Hönekopp, 2008), although this did not predict outcome for cannabis use in the current study. This

finding may be partly explained by a distinction between 'readiness to change' and 'receptivity for treatment' (DiClemente, 1999; DiClemente, Schlundt & Gemmell, 2004). Readiness to change and receptivity for treatment are thought to represent different constructs, and it is possible for a person to score highly on one domain and not the other. Studies have found that treatment outcome for substance use can be adversely affected if scores on treatment receptivity are low, even when the individual scores highly on measures of readiness to change (DiClemente, 1999; DiClemente, Lee & Whyte, 1998), and it is possible that this was the case in the present study.

The results of this study indicate that there was a lower level of baseline cannabis use among participants with psychosis, but both participant groups were found to experience a similar level of cannabis related problems. This supports findings from previous research (B. Green et al., 2004) and suggests that substance users with psychosis may be at increased risk of experiencing negative drug related effects and problems with lower levels of cannabis use. This may relate to the theory of 'supersensitivity' for substance use in psychosis (Mueser et al., 1998) which proposes that people with psychosis have an increased psychobiological sensitivity to drugs of abuse. This sensitivity results in an increased likelihood of experiencing drug related problems with relatively small amounts of substance use compared to people without psychosis. The present results appear to lend some support to this theory and suggest that relative to controls even small amounts of cannabis use may be problematic for people during the early phase of psychotic illness.

A number of different studies have now examined the reasons for cannabis use among people with psychosis during the first-episode of illness (Pencer & Addington, 2008) and long-term psychosis (Addington & Duchak, 1997; Schofield et al., 2006). The results of

these studies support the idea that despite the heterogeneity in relation to the stage of psychotic illness (i.e. first-episode or long-term psychosis) the reasons for cannabis use are broadly similar; that is, to increase positive affect, alleviate dysphoria and for social related reasons. In contrast, reasons related to the self-medication of positive psychotic symptoms and medication side effects are infrequently reported (Addington & Duchak, 1997; Schofield et al., 2006; Dekker et al., 2009; Pencer & Addington, 2008). Therefore, the results of this study in terms of reasons for use may be generalisable to all patients with psychosis, irrespective of the stage of illness. As discussed in chapter 5, the social networks of patients with first-episode psychosis may differ to the social networks of patients with long-term psychosis. Therefore, the results of this study which suggest that cannabis users with psychosis may have a smaller social network compared to cannabis users without psychosis may not be applicable to patients with long-term psychosis. The course of cannabis use may also differ depending on the stage of psychotic illness. Evidence suggests that there is a significant decline in the use of cannabis during the first-episode of illness (Addington & Addington, 2007; Gonzáles-Pinto et al., 2011), whereas the use of cannabis appears to be relatively stable among individuals with long-term psychosis (Margolese et al., 2006). Therefore, the results of this study in relation to change in cannabis use during the first six months of early stage psychosis may not be generalisable to patients with long-term psychosis.

The prospective matched-group design of the current study allowed for the examination and comparison of motives for cannabis use, social networks and social status, as well as change in the use of cannabis over time between participants with and without psychosis. This is the first UK study to directly compare the reasons and expectancy of cannabis in people with and without psychosis. The results indicate that there are similar motives for

cannabis use between the two populations, and the use of cannabis during the early phase of illness does not appear to be motivated by psychosis specific reasons.

This study has several limitations. Previous research in patients with established schizophrenia has found motives for the use of cannabis to vary according to the severity of use, with patients using greater levels of cannabis more likely to cite illness and medication related reasons (Fowler et al., 1998). The level of cannabis use was not examined in relation to motives in this study, and has rarely been investigated in other research, although the examination of this may help to further our understanding of the motivational factors for the use of cannabis among people with co-occurring psychosis. There is evidence to suggest that the study lacked sufficient power to detect significant differences between participant groups in relation to the reasons for cannabis use. However, the effect sizes for both reasons for cannabis use and cannabis expectancy were small and the was no trend significance in the data; therefore even with a larger sample size and adequate levels of power it is unlikely that there would have been significant differences in the motives for cannabis use between the two participant groups. The age of cannabis use onset was not assessed in this study, but an early age of cannabis use onset (<17 years) has been found to be associated with increased levels of substance use dependence (Lynskey et al., 2003); therefore it is recommended that the age of first use of cannabis is assessed in future research. The naturalistic nature of this study meant that the control group was not matched for the level of cannabis use at baseline. This is likely to reflect the fact that individuals with psychosis tend to use cannabis at a much lower level (Mueser et al., 1998). In the current study the difference between participant groups in the level of cannabis use at baseline may go some way in explaining why participants without psychosis had significant reductions in many aspects of their cannabis use in contrast to

participants with psychosis. The differences in the modality of treatment between participant groups may also partly explain these results. It is recommended that future research recruit a sufficiently large participant sample in order to statistically match for the level of cannabis use; the small sample size in the current study precluded the statistical matching of participants. Lastly, the rate of participant refusal for this study is not known, which may have implications regarding the representativeness of the participant sample.

This study is the first to directly compare change in the use of cannabis for people with and without psychosis. The study was designed to ensure all participants were recruited upon entry to treatment, as research suggests that most change in substance use occurs during the early stage of first-episode psychosis (Addington & Addington, 2007). However, although participant groups were matched for age and gender and all participants were in the early stage of treatment, the main reason for help-seeking differed between participant groups. Participants with psychosis primarily sought help for mental health related reasons whereas participants without psychosis primarily sought help for drug related reasons, and it could be argued that this may have contributed to the greater level of change in cannabis use among participants without psychosis.

This study suggests that the reasons and expectancies that motivate the use of cannabis are similar for people with and without psychosis; therefore the same substance use interventions such as CBT and MI may be suitable for use in both populations. The results also highlight that people with first-episode psychosis may be more sensitive to the use of cannabis and experience drug related problems with much lower levels of use in comparison to cannabis users without psychosis, and that seemingly non-hazardous levels

of cannabis use may be problematic and have a deleterious effect for people with early stage psychotic illness.

CHAPTER 8

CONCLUSIONS AND IMPLICATIONS

8.0 Aims of the thesis

There were two main aims of this thesis. Firstly, this thesis aimed to investigate the longer-term impact of cannabis use on the symptoms of psychosis among young people experiencing their first psychotic episode. Secondly, the research aimed to examine the factors that motivate the use of cannabis, cannabis cessation and cannabis abstention among people with psychosis, as well as to explore if the use of cannabis is motivated by psychosis specific factors or otherwise 'normal' motives for use.

8.1 Summary of results

8.1.1 The relationship between cannabis use and the symptoms of psychosis

In terms of the first aim, the research examined the relationship between the use of cannabis and the symptoms of psychosis in two separate studies. The first study, reported in chapter 4, comprised a secondary analysis of a large-scale data-set for the National EDEN project; data was analysed for 348 first-episode psychosis patients followed prospectively over a period of twelve months after entry to treatment. The second study, reported in chapter 5, involved the

prospective examination of psychotic symptoms over a period of six months after entry to treatment for a total of 61 first-episode psychosis patients. The research examined the impact of the course of cannabis use (i.e. whether a person continues to use cannabis, has never used, or stops using cannabis), on the symptomatic outcome of psychosis.

The results of this research suggest that the continued use of cannabis may impede recovery in psycho-social functioning and may be associated with increased severity of mania during the first-episode of psychosis. In contrast to participants that stopped or had no use of cannabis, participants that continued to use cannabis during the first twelve months of treatment for psychosis had no improvement in their level of psycho-social functioning. Participants that continued to use cannabis also had significantly increased symptoms of mania compared to participants with no use of cannabis. No significant association was found between the use of cannabis and the positive or negative symptoms of psychosis or the level of general psychopathology. There was also no significant association between the level of cannabis use and the severity of psychotic symptoms.

These findings are in line with the results of previous research which have found the continued use of cannabis to impede recovery in psycho-social functioning, whereas the cessation of cannabis has been found to result in a significant improvement in functional outcome (Gonzáles-Pinto et al., 2011). The finding that cannabis use may significantly impact the symptoms of mania during the first-episode of psychosis has rarely been investigated in previous research. There is some evidence from research in the general population to suggest that cannabis use may be associated with increased symptoms of mania (Henquet et al., 2006a), but there is little empirical data among people with psychosis and the data that is available is inconsistent. For example, in a recent study the

use of cannabis at baseline was found to be associated with increased symptoms of mania, but there was no significant relationship between cannabis use and mania at six month follow-up (Baeza et al., 2009). The results of the current research suggest that the continued use of cannabis may adversely impact the symptoms of mania during the early stage of psychosis. At present we know very little of the relationship between cannabis use and the symptoms of mania, and it is unclear what the long-term implications of using cannabis may be in terms of manic symptoms. Given the lack of available data further research is required in order to more fully explicate the nature of this relationship.

There is some evidence to suggest that the continued use of cannabis is also associated with a higher rate of psychotic relapse among individuals with long-term psychosis (Martinez-Arevalo et al., 1994). Therefore, the continued use of cannabis appears to be associated with a poorer outcome in psychosis, irrespective of the stage of illness.

This research is important for several reasons. Firstly, studies suggest that the course of cannabis use (i.e. whether a person continues to use cannabis, stops using or has never used cannabis), may be prognostic of later outcome (Grech et al., 2005; Baeza et al., 2009). However previous research has often failed to account for any change in the use of cannabis and how a change in use may subsequently affect the course of psychosis (Addington & Addington, 2007; Caspari, 1999; Peralta & Cuesta, 1992; Linszen et al., 1994; A. I. Green et al., 2004). This is especially important to consider for people experiencing their first-episode of psychosis as this stage of illness is known to be a period of significant change in substance use (Harrison et al., 2008; Turkington et al., 2009), and the early stage of psychosis is recognised as being important in determining the long-term outcome of psychosis (Addington, 2007; Birchwood, 1999; Birchwood et al., 1998). The

studies described in chapters 4 and 5 help to address this gap in the literature. Secondly, the research in chapter 4 assessed a wide range of symptom variables known to be co-morbid with psychosis, such as depression, mania and psycho-social functioning, rather than focusing exclusively on the positive, negative and general symptoms of psychosis. There has been very little empirical study regarding the effect of cannabis use on the symptoms of mania and psycho-social functioning, the present study helps to address this knowledge gap and also raises some important points for future research. Thirdly, research indicates that the relationship between cannabis use and psychotic symptoms is dose-dependent, with increased adverse effects to psychosis at higher levels of cannabis use (Lambert et al., 2005; Linszen et al., 1994).The research in chapter 5 attempted to investigate this by examining the relationship between the level of cannabis use and the severity of psychotic symptoms. Nevertheless, other research (Greig et al., 2006) has categorised patients according to the level of cannabis use over time (i.e. persistent hazardous users, intermittent hazardous users, non-hazardous users) and research that assesses both the course and severity of use over time may be more efficacious in determining the overall effect of cannabis use on the level of psychotic symptomatology. Ultimately research is needed to further assess the impact of cannabis use and change in use on the long-term outcome of psychosis; it is important that this research assesses a wide range of symptomatic variables and also measures the impact of the severity of cannabis use.

As the results of this research (chapter 4) and previous literature (Grech et al., 2005; Gonzáles-Pinto et al., 2011; Baeza et al., 2009) illustrate, the course of cannabis use appears to be prognostic for later symptomatic outcome in early stage psychosis. Therefore it is important to understand the course of cannabis use during this phase of psychotic

illness. The research reported in chapter 7 examined the course of cannabis use in twenty-two first-episode psychosis patients. The study examined changes in the frequency and quantity of cannabis use, as well as the level of dependence and cannabis related problems during the first six months after entry to treatment for psychosis. The study found that there was no significant change in any of these indices of cannabis use. Several studies have now examined the course of substance use (i.e. stopped use, continued use, no use) during the first-episode of psychosis, although only one study (Wade et al., 2006a) has examined change in other correlates of cannabis use such as frequency and dependence. In order to enhance current intervention efforts for substance use it is important to fully understand the course of cannabis use, taking account of a range of variables related to consumption and problematic use. This study provides data regarding change in the frequency and quantity of cannabis use, the level of cannabis dependence and cannabis related problems; something that previous research has often failed to do.

The study in chapter 7 also compared change in cannabis use among people with psychosis to cannabis users without psychosis who were matched for age and gender. The results indicate that despite a significantly lower level of cannabis use among participants with psychosis, both groups were found to have a similar level of cannabis related problems, such as financial, health and relationship difficulties. This finding may relate to the theory of 'supersensitivity' for substance use in psychosis (Mueser et al., 1998) which proposes that people with psychosis have an increased psychobiological sensitivity to drugs of abuse. The current findings lend some support for this and suggest that people with psychosis may be more likely to experience drug related problems with much lower levels of cannabis use.

The finding that participants with psychosis had the same level of cannabis related problems to participants without psychosis despite a significantly lower level of use (chapter 7) is in line with the results of previous research (B. Green et al., 2004). Further support for the theory comes from research which suggests that individuals with psychosis are less likely to maintain moderate drinking without experiencing negative consequences in comparison to the general population (Drake & Wallach, 1993), and research has found people with psychosis to experience drug related problems at very low levels of drug use (Lehman, Myers, Dixon & Johnson, 1996) and to be more sensitive to the effects of THC in pharmacological challenge tests (D'Souza et al., 2005). However other research has failed to find support for the theory. Pencer and Addington (2008) found higher levels of cannabis use among individuals with psychosis compared to controls, and research designed to empirically test the supersensitivity hypothesis found little support for the theory (Gonzalez et al., 2007).

If people with psychosis are 'supersensitive' to the effect of cannabis as the results of the current research suggest, this may have implications for the assessment of substance use in mental health populations, and lower diagnostic scores may be required to indicate drug-related problems. Indeed, there is already evidence that instruments designed to measure the level of dependence in the general population may require adaption for use within mental health populations; low scores on the addiction severity inventory have been found to be indicative of dependence in people with psychosis (Lehman et al., 1996), and a lower cut-off score on the severity of dependence scale for cannabis use is suggested for individuals with psychosis (Hides et al., 2007) compared to the general population (Swift, Copeland & Hall, 1998). Firstly however, further research is required to confirm if people with psychosis have an increased psychobiological sensitivity to cannabis use.

8.1.2 Motives for the use of cannabis

The second aim of the thesis was to explore the motivational factors for cannabis use among people with first-episode psychosis. The research aimed to highlight the factors that may be associated with cannabis use, any changes in the level of use, cannabis cessation and cannabis abstention. This was done using both quantitative and qualitative methods, and these results were reported in chapters 5 and 6. Lastly, the research also sought to identify if the motives associated with the use of cannabis in this population represent psychosis specific factors, or if they instead represent otherwise 'normal' motives for use. To examine this, twenty-two first-episode cannabis using patients were recruited and compared to twenty cannabis users without psychosis, who were matched for age and gender, and both in the early stages of treatment for either mental health or drug use. These results were reported in chapter 7.

The study reported in chapter 5 examined if there were differences in cannabis expectancy, social networks and social status for participants with psychosis currently using cannabis, participants that had stopped using cannabis, and participants with no history of cannabis use. The results indicate that cannabis abstainers had significantly greater global negative cannabis expectancy compared to cannabis users, but there were no significant differences in positive cannabis expectancy. This suggests that abstention from cannabis during the first-episode of psychosis may be the result of increased negative expectancy, rather than a lack of expected positive or beneficial effects of cannabis use. The study also found differences in the composition of the social network between cannabis users and cannabis abstainers, with cannabis abstainers having significantly fewer cannabis users in their social networks and significantly more non-cannabis using social contacts. The study

found no significant differences between participants using cannabis and participants that had stopped cannabis use in terms of cannabis expectancy or social networks.

The finding of increased negative cannabis expectancy among cannabis abstainers is in line with findings from the general population (Aarons et al., 2001; Simon & Aarens, 2007). In the current study no association was found between cannabis cessation and increased negative cannabis expectancy, which is in contrast to research findings in the general population (Aarons et al., 2001), but the results are in line with research findings among people with psychosis (Mueser et al., 1995).

Research in the general population suggests that the social network is associated with substance use; the number of peers that use cannabis has been found to be a significant predictor of the initiation and maintenance of cannabis use (Chabrol et al., 2006; Knutsche & Jordan, 2006; Kosterman et al., 2000), whilst the number of peers opposed to cannabis use may be influential in preventing the use of cannabis (Chabrol et al., 2006). The cross-sectional nature of the analysis in the present study means we are unable to infer causality, but the results suggest that the composition of the social network may be associated with cannabis use behaviour among people with first-episode psychosis.

The results of this study help to further our understanding of the factors involved in the use and non-use of cannabis among people with psychosis. At present only one study has assessed cannabis expectancy in relation to substance use, cessation and abstention in psychosis (Mueser et al., 1995), however this study recruited participants on the basis of substance use rather than cannabis use and only 50% of the sample reported any history of drug use, as a result it is not clear what percentage of the sample may have had direct

experience of cannabis use and this methodological shortcoming limits the findings. The current study builds upon this earlier research by recruiting patients on the basis of either current, past or no use of cannabis. The study is also the first to examine the social network in relation to cannabis use, cessation and abstention in psychosis, and the results highlight that the composition of the network may be associated with abstinence from cannabis use. At present there is very little empirical research that has focused on the factors that may influence the cessation of cannabis use or abstention from cannabis among people with psychosis, as most research has instead focused on the motivational factors involved in the use of cannabis. This study helps to further our understanding of the factors involved in cannabis use and represents an initial step towards understanding the motivational factors that may be influential for cannabis cessation and abstention during the first-episode of psychosis.

The study reported in chapter 6 aimed to further explore the factors associated with cannabis use, cessation and abstention and involved qualitative methodology to interview 30 first-episode psychosis patients who were using cannabis, had stopped using cannabis or had never used cannabis. This study found that cannabis was not used for psychosis specific reasons, such as to self-medicate psychotic symptoms, but rather the initiation and maintenance of cannabis use as well as change in the level of use was motivated by social factors, such as peer influence and social facilitation. Other 'normal' factors such as pregnancy or loss of employment were also found to result in a change in the level of use. In contrast to reasons reported in research among the general population however, concerns regarding the potential negative effect of cannabis use on mental health were found to be linked to (and possible motivate) decreased cannabis use and cannabis cessation. Among participants with no history of cannabis use concerns regarding the

exacerbation of psychotic symptoms or the precipitation of psychotic relapse as a result of cannabis use were also influential for abstention from cannabis. Other factors perceived to be influential for abstention from cannabis were broadly similar to reasons among the general population and included family disapproval, addiction, and religion. In summary, the study suggests that the reasons for cannabis use may be similar to the general population, but in contrast to the general population the reasons for decreased cannabis use, cannabis cessation and cannabis abstention may be motivated by mental health related factors.

Previous research in psychosis has primarily focused on the reasons for cannabis use and there is a lack of data regarding the factors that may be influential for a change in the use of cannabis and cannabis cessation. The study described in chapter 6 indicates that mental health related reasons may not be salient in the decision to use cannabis or for the continuation of cannabis use; instead the reasons for cannabis use appear to be similar to those reported in the general population (Simons et al., 2000; Lee et al., 2007). However mental health related reasons may be salient for decreased cannabis use, cannabis cessation and cannabis abstention among people with first-episode psychosis, which is in contrast to findings from research in the general population (Terry et al., 2007; Costa et al., 1999; DeWit et al., 1995). The reasons for cannabis cessation in psychosis have rarely been investigated in previous research, and there have been methodological shortcomings in the few studies that have attempted to examine this, such as being based upon medical records (Dekker et al., 2008) or using non-standardised questionnaire methods for which limited information is provided (Addington & Duchak, 1997). The study described in chapter 6 builds upon the results reported in chapter 5 and furthers our understanding of the factors that influence the initiation and continued use of cannabis, as well as changes in

the level of use, cannabis cessation and abstention. Understanding the factors the individual perceives to be important in the use of cannabis and change in cannabis use is important for tailoring substance use interventions for this population.

This study also has the advantage that the interview schedule was based upon previous research (Terry et al., 2007), in this previous study the data was quantified using a coding paradigm to enable the use of quantitative analysis. However as there is currently very little data regarding the factors that are influential for change in cannabis use and cannabis cessation in people with psychosis, the data in the current study was analysed using qualitative grounded theory methods (Charmaz, 2006). This was to avoid potential data loss that may result from the use of a pre-existing data coding paradigm and to explore the motivational factors of cannabis use, change in use and cannabis cessation in greater depth.

In order to examine if the motivational factors for cannabis use among people with first-episode psychosis were psychosis specific, the study reported in chapter 7 compared the motives for cannabis use in people with and without psychosis who were matched for age and gender and were in the early stages of treatment for either mental health or drug use. The study found that with the exception that cannabis users without psychosis used cannabis more for coping related reasons, there were no significant differences in either the reasons for cannabis use or cannabis expectancy between participants with and without psychosis. The study also found that cannabis users with psychosis had a significantly smaller social network.

The finding that participants with psychosis had a smaller social network is in line with findings from previous research which has found there to be an inverse relationship between the level of psychopathology and the size of the social network in substance users (Westermeyer & Neider, 1988), however the current study is the first to directly compare the social networks of substance users with and without psychosis. Regarding the motives for cannabis use, the findings from this study are in line with previous research which has concluded that the motives for cannabis use among people with psychosis are similar to motives in the general population, and that psychosis specific reasons for cannabis use are not a primary motive for the use of cannabis among people with psychosis (Spencer, 1994; Dekker et al., 2009). However due to the lack of matched-design studies this conclusion has often been derived from research that has been conducted separately within each of the two populations, and the methodological differences between studies can make it difficult to compare the results. Furthermore the studies that have compared motives for cannabis use in people with and without psychosis using a matched-design paradigm have often been conducted among individuals with more established psychosis (B. Green et al., 2004; Schaub et al., 2008), have failed to use standardised measures of assessment (Green et al., 2007; Dekker et al., 2010) or have not been specific to cannabis use (Gonzales et al., 2007).

The study described in chapter 7 addressed the limitations of this previous research, and is the first UK study to directly compare the reasons and expectancy for cannabis use in people with and without first-episode psychosis. This study is also the first to compare the social networks of people with and without psychosis. Participant groups were matched on key demographic factors such as age and gender, and the design of the study ensured that all participants were in the early stage of treatment. The study also used a standardised

measure of the reasons for substance use in psychosis (Spencer et al., 2002), this measure is the only validated scale that includes items related to mental health related reasons for use. This scale has been used to assess the reasons for substance use in psychosis (Spencer et al., 2002), but this is the first time the measure has been used in relation to the use of cannabis. However, the scale has been found to have poor internal consistency (0.41) for the mental health sub-scale (Spencer et al., 2002). Assessment of the motives for substance use among people with psychosis has been somewhat limited by the lack of standardised measures that include mental health related reasons for use. The scale developed by Spencer et al. (2002) represents the first step towards this, but the measure requires further work in order to improve its psychometric properties.

The results of this research in relation to the motives for cannabis use (i.e. reasons and expectancy) among people with first-episode psychosis appear to be similar to motives for cannabis use among people with long-term psychosis (Addington & Duchak, 1997; Schofield et al., 2006; Mueser et al., 1995). However, there is evidence to suggest that the social network may change following the first-episode of psychosis, with a decrease in size (Lipton et al., 1981) and an increase in the proportion of patients as network members (Albert et al., 1998). Thus the results of this research which suggest that association with non-drug using peers is related to cannabis abstention during the first-episode of psychosis (chapter 5), and the finding that cannabis users with psychosis have a smaller social network compared to cannabis users without psychosis (chapter 7), may not be generalisable to patients with long-term psychosis. Further research is required among patients with long-term psychosis in order to identify the factors that are associated with the use and non-use of cannabis.

8.2 Overall strengths of the study

This programme of research has a number of strengths, many of which have already been summarised in the discussion of each study earlier in this chapter; however the research has a number of additional strengths which are outlined below.

8.2.1 Participant recruitment and retention

This research involved recruiting a population that is traditionally difficult to engage in research, and all of the prospective studies reported in this thesis were successful in achieving a high rate of participant retention. Systematic procedures were used in order to try and maximise participant retention, this included ensuring that the researcher firstly contacted the participant's key-worker at follow-up in order to ensure the participant was mentally well enough to take part (i.e. they were not experiencing severe florid psychotic symptoms). If the researcher could not contact the participant via phone, a written letter was sent, and if this was not successful the participant was approached to take part in the follow-up assessment by their key-worker at their next appointment. Where possible, assessment at follow-up was still completed if the participant had moved to a new geographical area, was incarcerated during the follow-up period or was discharged from treatment service. As a result of these methods there was a very low rate of participant attrition. The rate of attrition at twelve months for the study reported in chapter 4 was 28% (n= 96) out of a total baseline sample of 348 patients. The rate of attrition at six month follow-up assessment for the study reported in chapter 5 was 9.84% (n= 6) out of a total baseline sample of 61 participants, and in chapter 7 the rate of attrition was also low, with just 19.05% (n= 8) of the baseline sample of 42 participants lost to follow-up at six month assessment.

8.2.2 Methodological strengths

Research indicates that the early phase of first-episode psychosis is the period of most change in substance use (Harrison et al., 2008; Turkington et al., 2009; Addington & Addington, 2007) therefore in order to maximise the potential for measuring how a change in the use of cannabis may impact psychotic symptomatology patients were recruited shortly after admission to treatment service for psychosis. This inclusion criterion helped to improve the methodological design of the study, although the specific nature of the inclusion criteria adversely impacted the rate of recruitment and made what is an already difficult-to-engage population even more difficult to recruit.

This research suggests that the course of cannabis use may be associated with outcome for mania and psycho-social functioning and research that prospectively examines the course of cannabis use and how a change in use may affect the course of psychosis is likely to help prevent spurious conclusions regarding the effect of cannabis use in psychosis. However, this type of design is time consuming and can be costly; data collection for the prospective research in chapters 4, 5 and 7 of this thesis took between 2.5 and 4 years. Nevertheless this type of research design is important in furthering our understanding of the relationship between the use of cannabis and the early stage of psychosis.

The research in this thesis also ensured that all of the assessment measures used were standardised scales with good psychometric properties. The only exception to this was the scale used to assess the reasons for cannabis use (chapter 7), which has been found to have poor internal consistency for one of the sub-scales (Spencer et al., 2002). High levels of inter-rater reliability were established for the Positive and Negative Syndrome Scale (PANSS; chapter 5) which necessitates the use of an interviewer led format. For the qualitative research reported in chapter 6 the interview schedule was based on previously

published research (Terry et al., 2007), and a comprehensive one-day NHS qualitative training course was completed prior to data analysis being conducted for the study.

8.2.3 Scientific benefit

The research helps to address some of the gaps in the previous literature regarding the relationship between the course of cannabis use and the symptomatic outcome of psychosis during the early stage of psychotic illness, and the results indicate that the course of cannabis use may affect the level of psycho-social functioning and mania during the first-episode of psychosis. The research also provides more specific data regarding change in cannabis use during the first-episode of psychosis (i.e. in terms of the frequency and quantity of use, the level of dependence and the level of cannabis related problems).

This research is the first to directly compare the reasons for cannabis use and cannabis expectancy in a UK patient sample of cannabis users with and without psychosis, and the study is also the first to directly compare the social networks of substance users with and without psychosis. The research provides further evidence that the same factors may motivate the use of cannabis for people with and without psychosis. There is currently a lack of research that has assessed the reasons for change in cannabis use, the cessation of cannabis and cannabis abstention in psychosis. This research helps to further our understanding of the motivational factors for change in cannabis use, cannabis cessation and abstention during the first-episode of psychosis, and suggests that in contrast to the general population concern regarding the impact of cannabis use on mental health may be motivationally salient.

8.3 Limitations of the study

8.3.1 Biological confirmation of drug use

Assessment of substance use in this research was based on self-report measures and was not confirmed using biological assays of drug use. However, biological tests to confirm substance use are often costly and may limit the size of the participant sample. Furthermore, there is evidence to suggest that there is a high level of agreement between self-report measures of substance use and biological assays of drug use among people with psychosis (Wolford et al., 1999) and drug users in treatment (Zanis, McLellan & Randall, 1994).

8.3.2 Sample size and observed statistical power

The sample size employed in each of these studies was relatively small; this is an inherent problem in research among people with psychosis and reflects the fact that this represents a hard-to-engage population. The observed power for the main analysis in each study was calculated. This suggested that the research may have lacked sufficient power to detect significant differences between participant groups. However, with the exception of the finding in chapter 4 in relation to positive psychotic symptoms, the null differences in the results of this research are not thought to be due to a lack of power as the data did not show trend significance, the effect sizes of analyses were small and there were similar mean scores between groups. In chapter 4 however, the data showed trend significance for a greater level of positive psychotic symptoms among participants that continued to use cannabis in comparison to participants with no cannabis use; it is possible that with a larger sample size this finding may have reached statistical significance.

Importantly, the data for the results of chapter 7 regarding the motives for cannabis use did not show trend significance for any of the reasons or expectancy sub-scales and all of the effect sizes were small. Therefore even with a larger sample size it is unlikely that there would have been significant differences in the motives for cannabis use between these two groups. Consequently it is argued that it is valid to conclude that similar factors motivate the use of cannabis among people with and without psychosis.

8.3.3 Methodological limitations

This study did not assess the motives for cannabis use in relation to the severity of use. Research suggests that motives for use may differ according to the level of cannabis use, and there is some research to suggest that people with psychosis who use cannabis at higher levels may be more likely to cite medication and illness related reasons for use (Fowler et al., 1998). In order to further understand the motives for the use of cannabis in psychosis it is suggested that future research examines the motives for use in relation to the severity of cannabis use.

Data is unavailable for the rate of participant refusal for the studies described in chapters 5 and 7; this may have implications regarding the representativeness of the participant sample.

8.4 Suggestions for future research

A number of important findings have been highlighted as a result of this research, however the results of this research have also helped to highlight the gaps in the existing research literature and a number of recommendations for future research are made.

Research is required to further examine the impact that using cannabis may have in terms of symptomatic outcome during the first-episode of psychosis. Prospective research that assesses the impact of the course of cannabis use (i.e. whether a person continues to use cannabis, has never used or stops using cannabis) and the level of cannabis use on the symptoms of psychosis is likely to help prevent spurious conclusions regarding the relationship between cannabis use and the early course of psychiatric illness. Ideally research should also assess a broad spectrum of symptoms, rather than focusing exclusively on the symptoms of psychosis, especially as the results of this research indicate that cannabis use may adversely affect the symptoms of mania and psycho-social functioning during the first-episode of psychosis. Examination of the effects of cannabis use on a wider range of symptoms and the level of functioning has been somewhat overlooked in previous research.

This research highlights that the use of cannabis may have a deleterious effect on the severity of the symptoms of mania during the first-episode of psychosis. There has been little empirical investigation of the relationship between the use of cannabis and the symptoms of mania, especially in people with psychosis. Research is required to investigate how the use of cannabis might affect the symptoms of mania in early stage psychosis, and how this may impact the long-term outcome of psychosis.

This research also provides some support for the theory of 'supersensitivity' of substance use in psychosis (Mueser et al., 1998) and suggests that people with psychosis may experience adverse effects of cannabis at much lower levels of use in comparison to the general population. However, the existing evidence for the theory is inconsistent and research is required to investigate this further. If people with psychosis are found to have an increased biological sensitivity to drugs of abuse this may have implications for the validity of current screening and assessment tools for substance use, which are typically developed for use within the general population.

Finally, little is currently known about the motivational factors that may influence the cessation of cannabis and any change in the level of cannabis use among people with psychosis, and although this research represents an initial step towards understanding this, further research is required. Understanding the factors perceived to be salient in change in cannabis use is likely to be important in tailoring and enhancing current substance use interventions for people with first-episode psychosis.

8.5 Clinical implications

The reasons for cannabis use may represent reasons for initial use or may instead represent post-hoc rationalisations for use (Drake et al., 1998). Nevertheless it is important to understand the motives for cannabis use from the point of view of the individual as this represents the first step in tailoring treatment for substance use.

The research evidence suggests that psycho-social interventions for substance use in psychosis such as cognitive behavioural therapy (CBT) and motivational interviewing

(MI) may not be as efficacious for substance use compared to the general population (see chapter 2 for a review). These approaches are based upon the individual's motives for using cannabis. The current research suggests that the motives for cannabis use may be similar for people with and without psychosis, and so it remains unclear why interventions for substance use may be less successful among people with psychosis. At present there is very little data regarding the factors that influence the cessation of cannabis use among people with psychosis, and a greater understanding of this may help to improve the efficacy of substance use treatment for this population. The results of the study in chapter 6 represent an initial step in understanding these factors, and suggest that concerns regarding the impact of cannabis use on mental health may be salient in the decision to stop using cannabis for people experiencing their first-episode of psychosis. The results of this research also suggest that abstinence from cannabis among people with first-episode psychosis may be the result of increased expectancy of negative effects (chapter 5) as well as concerns about the impact on mental health (chapter 6). Therefore psycho-education regarding the potential adverse effects of cannabis on mental health may help to prevent the use of cannabis in this population.

8.6 Summary

The present research focused on two separate issues related to the use of cannabis, firstly examining the relationship between the use of cannabis and symptomatic outcome during the first-episode of psychosis, and secondly, the motives for the use of cannabis, the factors associated with change in cannabis use, cannabis cessation and cannabis abstention. The research also investigated if the motives for cannabis use among people

with psychosis are influenced by psychosis related reasons or if they are instead broadly similar to motives among cannabis users without psychosis.

The results of the research suggest that the continued use of cannabis may have a deleterious effect on the symptoms of mania and the level of psycho-social functioning during the first-episode of psychosis. The results also suggest that the motives for the use of cannabis are not influenced by mental health related reasons; rather motives for use appear to be similar to motives among cannabis misusing young people without psychosis. Further research is required to understand the reasons for change in the use of cannabis and cannabis cessation during the early phase of psychosis; although the results of this research provide some evidence to suggest that decreased cannabis use, cessation and abstention may be motivated by concerns regarding the impact of cannabis use to mental health.

It is clear that in order to enhance existing interventions for cannabis use among people experiencing their first-episode of psychosis it is important to understand the course, effect and motives for cannabis use among this population; this research goes some way toward achieving this. It is suggested that clinical assessment routinely explore the motivational factors involved in the use of cannabis from the point of view of the individual, as this represents the first step in tailoring effective treatment.

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APPENDIX I

A. ETHICAL APPROVAL – CHAPTER 6

B. ETHICAL APPROVAL – CHAPTERS 5 & 7

[Not available in the digital version of this thesis]

APPENDIXII

A. INFORMATION AND CONSENT FORMS- CHAPTER 6 (SEE PART 2)

B. INFORMATION AND CONSENT FORMS- CHAPTERS 5 & 7

THE UNIVERSITY
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APPENDIX II.A

PATIENT INFORMATION SHEET

March 2009, version 4.

Study Title: A National Evaluation of Early Intervention in Psychosis Services: DUP, Service Engagement and Outcome (The National EDEN Project).

Secondary Study: Causal factors of cannabis use and non-use (participation in the secondary study is optional).

You are being invited to take part in a research study. Before you decide whether or not you wish to take part, 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.

The purpose of the study:
The aim of the project is to evaluate the implementation and impact of Early Intervention Services (EIS) for people aged between 14-35 years of age in different areas of the country.

Why have I been chosen?
We are inviting everyone aged between 14-35 years of age who has been referred to the Early Intervention Service to take part in this study. This will involve approximately 800 young people across the country.

Do I have to take part?
No – involvement in this study is entirely voluntary. However if you decide to take part, you are still free to withdraw at any time without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect the standard of health care you receive now or in the future.

What will happen to me if I take part?
PART ONE
If you agree to take part in the study, we will use the data from assessments that have been completed with you by the clinical team. The data will be put into a database and analysed together with data from other clients of the Early Intervention Service (EIS). All data will be annonymised. We would also like to ask you some questions about when you first became unwell, including any incidences of self-harm or violence. This is to determine how you came into contact with the EIS and also how long you were unwell before contact was made with services.

At this stage we will ask a small number of people (20 in each service, over 2 years) to also take part in a face-to-face interview with a trained researcher who is of the research team, about their experiences of the Early Intervention Service. The researcher will ask you questions about how easy services are to access, the types of treatments you have been offered and your general

observations on the treatment you have received. The interview will be in a place where you feel comfortable, for example in a quiet room in the Early Intervention Service or in your own home. If you like, you can invite a relative or carer to be present during the interview.

You may also be asked whether you feel that it is appropriate for the research team to contact a friend or relative to ask similar questions. However, this contact will only be made with your permission and the purpose of this contact is to provide them with an opportunity to share their perceptions of how the Early Intervention Service has responded to your needs.

What are the possible side effects of taking part?
Some of the questionnaires **may** cover issues that are sensitive and/or distressing for you – you can stop if you feel uncomfortable at any stage of the interview, and refuse to answer questionnaires that you feel are too distressing.

What are the possible benefits of taking part?
At a national level, since up to 3% of people in the UK develop a serious mental illness, access to good quality mental health services at an early stage of developing an illness may improve an individual's chances of recovery and the quality of life for individuals and their families. On a personal level, involvement in the project may help you think about and reflect more on your treatment and the treatment you would like to receive in future.

What will happen when the research study stops?
This research study lasts from July 2005- April 2008. There will be no change to your care or to services when the study stops, but we hope that the final results of the study will help the health professionals involved in running Early Intervention Services to make changes in the medium to longer term to further improve services. The results of the study will be written up in 2008, you will be able to obtain findings from this project on www.iris-initiative.org.uk and the Rethink website www.rethink.org

Will my taking part in this study be kept confidential?
All information collected as part of this research including questionnaires, typed up notes of interviews and tape recording of interviews will be kept in a locked filing cabinet in the Department of Primary Care and General Practice at the University of Birmingham. Any information from or about you will have your name, address and any other identifying features removed so that you cannot be recognised from it. This means that your anonymity will be preserved at all times during and after the study time period. The tapes will be destroyed 5 years after the study has been completed in line with University of Birmingham research policy.

What will happen to the results of the research study?
The results of the study will be written up for publication in health professional journals and will be presented at conferences in the UK and abroad. However your anonymity will be preserved at all times.

Who is organising and funding the research?
The research is organised by The University of Birmingham, Department of Primary Care and General Practice and funded by a grant from the Department and Health and NIMHE (National Institute for Mental Health in England). Indemnity is provided by the University of Birmingham. The protocol has been reviewed by the [redacted] Research Ethics Committee.

Contact for Further Information
Professor Helen Lester (Principal Investigator) on [redacted], or Sonal Shah, (Project Officer) on [redacted] Department of Primary Care and General Practice, University of Birmingham, Edgbaston, Birmingham B15 2TT. If you agree to participate, you will be given a copy of this Carer Information Sheet and a copy the signed consent form to keep. If you have any concerns about the study and wish to contact someone independent, please telephone [redacted], the local ethics committee co-ordinator on [redacted] between 9am and 5pm.

<u>PART TWO</u>- ONLY FOR INDIVIDUALS WHO HAVE ALREADY PARTICIPATED IN THE NATIONAL EDEN RESEARCH PROJECT

In addition to the above you will be asked to take part in an interview about your experience of cannabis, this will be tape recorded but no personally identifiable information will be on the recording. You will then be asked to complete a short questionnaire. This is expected to last less than 50 minutes. Please note that **this is optional** and **you may refuse to complete this additional interview and questionnaire.**

Do I have to fill in these additional questionnaires?
No. It is up to you to decide whether or not you wish to complete these additional questionnaires. If you do, you will be given this information sheet to keep and will be asked to sign a consent form (with two parts). You are still free to withdraw at any time and without giving a reason. People will receive the same standard of care even if they do not take part in the study. This is also true for people who take part and then decide to leave the study at a later point.

Expenses and Payments
If you decide to participate in this second part of the study you will be reimbursed £10 to cover travel expenses and any other out of pocket expenses you might incur.

If during the course of the research you disclose information that indicates there may be a risk to yourself or others, for your own welfare this information will be shared with the cinical team.

Contact for Further Information
Jennifer Seddon on [redacted] School of Psychology, University of Birmingham, Edgbaston, Birmingham, B15 2TT. If you agree to participate, you will be given a copy of this Information Sheet and a copy the signed consent form to keep.

Thank you for reading this.

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PART TWO SHOULD ONLY BE COMPLETED IF PARTICIPANTS HAVE CONSENTED TO PART ONE

PART TWO

Centre No:
Patient Identification No for this study:

PATIENT CONSENT FORM (Over 16 years)

March 2009, Version 4.

Study Title: Causal factors of cannabis use and non use.

Name of Researcher:

Please initial box

1. I confirm that I have read and understand the information sheet dated March 2009 (version 4) for the above study and have had the opportunity to ask questions. ☐

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

3. I understand that sections of any of my medical notes may be looked at by responsible individuals from the Early Intervention Service, and/or research staff from the University of Birmingham or from regulatory authorities where it is relevant to my taking part in research. I give permission for these individuals to have access to my records. ☐

4. If during the course of the research you disclose information that indicates there may be a risk to yourself or others, for your own welfare this information will be shared with the clinical team. ☐

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

_____	_____	_____
Name of Patient	Date	Signature
_____	_____	_____
Name of Person taking consent (if different from researcher)	Date	Signature
_____	_____	_____
Researcher	Date	Signature

THE UNIVERSITY OF BIRMINGHAM

Information sheet

Study Title: Why do some young people use cannabis and others don't?

You are being invited to take part in a research project. Before you decide to participate 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 if anything is unclear or if you would like more information.

The purpose of the study:

This study aims to understand why some people start to use cannabis whereas others do not and what influences change in cannabis use. ***You may be asked to take part in the study regardless of whether you have actually tried cannabis***.

Why have I been chosen? Do I have to take part?

We are asking many young people in both the NHS early intervention service (EIS) and substance use organisations to take part in the research. Involvement in this study is entirely voluntary. If you decide to take part, you are still free to withdraw at any time 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 now or in the future. You will be given at least 24 hours to decide whether or not you wish to take part in the research, however you may have longer then 24 hours to make your decision if you wish.

What will happen to me if I take part?

If you agree to take part in the study, you will be asked to complete a series of questionnaires now and again in six months time. These questionnaires are designed to understand your experience of cannabis. You may also be asked to participate in a very short face to face interview, this will be tape recorded but no personally identifiable information will be on the recording. Your participation in this study is expected to no longer than an hour.

What are the possible side effects of taking part?

Some of the questionnaires **may** cover issues that are sensitive and/or distressing for you – you can stop if you feel uncomfortable at any stage of the interview, and refuse to answer questionnaires that you feel are too distressing.

What are the possible benefits of taking part?

The information that you provide will be valuable in understanding what causes people to use cannabis, what makes people want to continue using cannabis and what makes them stop. The research will also provide information on the factors that may prevent people from using cannabis in the first place. Therefore the research is likely to have important clinical implications. On a personal level, if you currently use cannabis taking part in the research may help you evaluate your use of cannabis.

Expenses and Payments

If you decide to participate in this study you will be reimbursed £20 to cover travel expenses and any other out of pocket expenses you might incur.

What will happen when the research study stops?

This research is expected to run from October 2009 - June 2011. There will be no change to your care or to services when the study stops. The results of the study will be written up in 2011 and will be published in peer reviewed journals.

Will my taking part in this study be kept confidential?

The study is strictly confidential and no-one other than the researchers directly involved in the study will have access to your data. All information collected as part of this research including questionnaires, typed up notes of interviews and tape recording of interviews will be kept in a locked filing cabinet at the University of Birmingham. Any information from or about you will have your name, address and any other identifying features removed so that you cannot be recognised from it. This means that your anonymity will be preserved at all times during and after the study time period. The tapes will be destroyed 5 years after the study has been completed in line with University of Birmingham research policy. If during the course of the research you disclose information that indicates there may be a risk to yourself or others, for your own welfare this information will be shared with the clinical team.

What will happen to the results of the research study?

The results of the study will be written up for publication in health professional journals and will be presented at conferences in the UK and abroad. However your anonymity will be preserved at all times.

Who is organising and funding the research?

The current research project is conducted by The University of Birmingham.

Contact for Further Information

If you have any further questions about the research you can contact Jennifer Seddon at

Independent advice and information regarding participation in scientific research is available from:

Thank you for reading this.

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CONSENT FORM
(Participant group one and three)

Study Title: Why do some young people use cannabis and others don't?

Please initial box

1. I confirm that I have read and understand the information sheet dated June 2009 (Version 2) for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation in this research is voluntary and that I have the right to withdraw at any time, without giving any reason, and without my medical care or legal rights being affected. ☐

3. I understand that the study is strictly confidential and anonymous. ☐

4. I understand that sections of my medical notes and results of assessments may be looked at by responsible individuals from the Early Intervention Service, and/or research staff from the University of Birmingham where it is relevant to my taking part in research. I give permission for these individuals to have access to my records. ☐

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

_____	_____	_____
Name of Participant	Date	Signature

_____	_____	_____
Name of Researcher	Date	Signature

THE UNIVERSITY
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CONSENT FORM
(Participant Group Two)

Study Title: Why do some young people use cannabis and others don't?

Please initial box

1. I confirm that I have read and understand the information sheet dated June 2009 (Version 2) for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation in this research is voluntary and that I have the right to withdraw at any time, without giving any reason, and without my medical care or legal rights being affected. ☐

3. I understand that the study is strictly confidential and anonymous. ☐

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

_____	_____	_____
Name of Participant	Date	Signature

_____	_____	_____
Name of Researcher	Date	Signature

APPENDIX III

A. CALGARY DEPRESSION SCALE

B. YOUNG MANIA SCALE

C. GLOBAL ASSESSMENT OF FUNCTIONING SCALE

D. POSITIVE AND NEGATIVE SYNDROME SCALE

E. MARIJUANA EFFECT EXPECTANCY QUESTIONNAIRE

F. REASONS FOR DRUG USE QUESTIONNAIRE

G. DRUG CHECK SCALE

H. SEVERITY OF DEPENDENCE SCALE

I. READINESS TO CHANGE SCALE

J. BRIEF IMPORTANT PEOPLE INVENTORY

K. SOCIAL COMPARISON SCALE

L. SEMI-STRUCTURED INTERVIEW SCHEDULE

[Not available in the digital version of this thesis]

APPENDIX III.L: SEMI-STRUCTURED INTERVIEW SCHEDULE

Cannabis Users.

Section A: Context of first use and patterns of cannabis use from onset to present day.

This is the main section of the interview and should therefore provide the most information. The aim is to obtain as full an account as possible regarding the perceived factors that are involved in the first use of cannabis and the factors that are involved in the decision to continue using cannabis. This section should also provide information regarding the factors that motivate change in level of cannabis consumption as perceived by the interviewee.

This section should provide detailed information regarding the context of first use, namely, who they were with, where they were and how old they were. It should establish if the individual used cannabis at the first opportunity, if they had previously had the opportunity to use cannabis and declined then the causal factors in the decision not to use cannabis will be ascertained. The subjective effects of cannabis will also be explored, i.e. how they felt when they first tried it.

The pattern of cannabis consumption from first use onwards will be assessed, including information on frequency of use in the beginning, and pattern of consumption over time, if level of consumption either increased or decreased why this was. The factors that play a role in the decision to continue to use cannabis will also be assessed and how the individual's reasons for cannabis use have changed over time, i.e. from initiation to present day.

The questions asked as part of this section should elicit detailed information to explain the above concepts, therefore it is important to probe and ask additional questions and follow any interesting leads.

Suggested Procedure

Ask the individual to tell you in their own words about the first time they used cannabis. This may be enough to elicit rich and detailed information about the context of first use, i.e. who they were with, how old they were, if it was the first opportunity, how they felt. If necessary additional probes should be used, namely,

● Was it the first opportunity you had ever had to use cannabis? If not, why did you say no the first time?

● Who were you with? Where were you?

● What did you think of cannabis the first time you tried it?
Prompt: Did you like it? If yes why, if not why not? How did it make you feel?

Additional questions will also be asked regarding consumption patterns and any changes in consumption:

● How frequently did you smoke cannabis in the beginning?

● Have/were there [been] times when you used more or less cannabis- increased/ reduced your use? If so why was this/ what led to this?

● What are the reasons that you use cannabis /continued to use cannabis? Did you use cannabis for different reasons in the beginning?

Section B: Smoking behaviour.

This section aims to investigate the social context in which cannabis is usually consumed. Does the individual usually smoke on their own or in a group and what are the reasons for this.

This question may provide some insight as to why the individual consumes cannabis (i.e. "I use cannabis as a way of socialising with people so I tend to smoke in a group" or "I only smoke when I feel low so I usually smoke alone"). Therefore, it is worth asking for specific examples in this section.

Suggested Procedure

Ask the individual to describe the typical social context in which they usually consume cannabis, i.e. 'Do/Did you usually smoke on your own or with others?' If the individual does not tell you the reason for this then additional probes may need to be used such as, 'Is there a reason for this?'

Try to ascertain the ratio of time spent consuming cannabis in each context, i.e. What percentage of the time do you smoke on your own, socially (in a group) or with your partner?

You also want to know if there have been any changes in the context in which cannabis is typically consumed over time; i.e. Has the context in which you usually smoke cannabis changed over time? (i.e. when you first started it was always a group activity but now you smoke more often on your own?)

Section C: Dependence

The aim of this section is to explore whether the individual feels they are/were dependent on cannabis. Information regarding what makes them think they are dependent or not dependent upon cannabis should be explored. Do they feel that they became tolerant to the effects of cannabis? If they did feel that they became tolerant did this have any consequences (i.e. lead to an increase in quantity, precipitated cessation). It is also important that the individual is asked about any periods of abstinence; if they have had periods of abstinence, what factors precipitated this, how did it make them feel, was it difficult to abstain? If the individual has never had any periods of abstinence what would make them consider abstaining? For those who have stopped using cannabis how has this affected them- what effect has it had.

Suggested Procedure:

Ask the individual if the felt they were/are dependent on cannabis. This is likely to generate the reasons why they felt they were/were not dependent (i.e. I became tolerant to the effects so I started using more, I tried to give it up but I couldn't) and may provide some insight into their cannabis use behaviour. If the responses are not automatically generated then ask additional questions, i.e. why did you feel you were dependent/ not dependent? Can you give me some examples?

It may also be necessary to ask additional questions such as:

● Do/did you feel you have/had to use more cannabis to get the same effect? What effect/consequences (if any) did this have?

● Have you ever had any periods of abstinence? If so why? (What made you change)? Was it easy to abstain? Were there any effects of abstaining?
Prompt: When did you stop? How did you feel about cannabis when you decided to stop? What role did cannabis play in your life/ How did it impact your life?

● Have you ever had or wanted to have help for your cannabis use?

● Have you ever felt guilty about your use of cannabis?

● What would make/made you think about stopping?
Prompt: have you ever thought about stopping? Why was this?

● Abstinent users: How has stopping use of cannabis affected you?
Prompt: How did using cannabis affect you? Has this changed since stopping?

Section D: Positive and negative effects.

This section aims to investigate the perceived positive and negative effects of using cannabis. Research suggests that individuals who continue to consume cannabis cite more positive than negative reasons for continuation, whereas abstinent cannabis users typically cite more negative reasons than current users.

Suggested Procedure:

Ask the individual to describe in their own words all of the positive effects of using cannabis, followed by all of the negative effects of cannabis use. This is likely to result in quite a few areas that may need further probing, you want to elicit as much information as possible about each positive and negative effect, i.e. how it impacted their lives, how it made them feel, what consequences it had.

Ask for specific examples of any positive or negative effects they have experienced and follow up any interesting leads.

Section E: Effects of cannabis on personal relationships/ social networks.

The purpose of this section is to investigate how the use of cannabis impacted upon the individual's personal relationships with significant people in their lives, such as parents and close friends. Are friends and family aware that the individual uses cannabis? What impact has the use of cannabis had on significant relationships? Has the use of cannabis changed relationships with people? If relationships have changed in what way have they changed and how does this make the individual feel? If relationships have changed in a negative way does this have a motivating role in wanting to cease cannabis use?

Suggested Procedure:

A series of questions should be asked in order to gain information on the impact of cannabis use on relationships with parents and friends, namely,

● Did your parents know when you were first using cannabis? If so did it affect your relationship with them (positive or negative)?

● If your parents did not initially know, do they know now? If so has it had an effect on your relationship (positive or negative)?

● Has cannabis use ever affected a personal relationship (positive or negative)? If so in what way? How does this make you feel?

Each of the responses to these questions may need to be probed further by asking the individual to fully explain how the relationship has changed, how the change made them feel and what consequences the change in the relationship had.

Non-Users of Cannabis.

Section F: General attitudes and perceptions of cannabis.

This section aims to explore the general perceptions of cannabis use and is not related to personal experience of cannabis. The section investigates similar concepts to those examined as part of section A with cannabis users, namely, what factors do they believe play a role in the decision to use cannabis for the first time and what factors are important in the decision to continue to use cannabis. Examination of these concepts will allow direct comparison between individuals that do and do not use cannabis, it is possible that any observed differences between these two cohorts may reveal why some individuals choose to use cannabis whereas others do not.

Suggested Procedure:

Ask the individual about their general perceptions of cannabis use regarding what they think may influence someone to start using and what they think may influence someone to continue to use cannabis.

Ask additional probe questions based on their responses such as why they think 'X' might influence someone to start using cannabis and why 'Z' might be important in the continuation of cannabis use. Make sure that all possible information has been obtained and the concept fully exhausted.

Section G: Personal experience of cannabis

This sections aims to investigate the extent the individual has had contact with cannabis and what effect they believe using cannabis would have on them. It may well be the case that the individual has never had the opportunity to use, i.e. they don't associate with anyone who uses cannabis, in this case additional questions such as 'how do you think you would react if you did have the opportunity' should be asked. If they have had the opportunity to use and have declined, the factors that influenced the decision to refrain will be explored, all responses should be followed up with additional probe questions. The perceived positive and negative effects of using cannabis will also be explored, as will the effect they think using cannabis would have on them- how they think it would affect their lives.

Suggested Procedure:

Ask the individual if they have ever had the opportunity to use cannabis. If the answer is yes and they have declined then further probe questions may be necessary in order to elicit all relevant information. Ask the individual to describe the context in which they were offered (i.e. who they were with, how old they were), more importantly you want to know the factors that influenced the decision not to use, ask them to explain why they declined, and how they felt when they were offered cannabis.

Ask the individual to describe all of the positive and negative effects they associate with cannabis use. Again additional probing may be required in order to fully understand each positive and negative effect.

Finally ask the individual to describe how they think using cannabis would affect them. This is a broad question and should therefore elicit rich and detailed information, some of which may have been covered by the opening question. Any additional areas not already covered may require a few additional probe questions such as, how would friends/family feel? what positive/negative effects do you think using cannabis would have on you? What consequences would it have? How would it affect your life?

Interview schedule.

General introduction: Thanks for meeting with me today, I know you have taken part in an earlier piece of research; the *national eden project* and as part of that project you were asked a few questions about use of drugs. Today I just wanted to ask you a few more questions about cannabis use. We are interested in people's views and attitudes towards cannabis, as well as personal experience. Everything you say is completely confidential and anonymous and there won't be any personal information on the tape recording of the interview. At the end there will be a short questionnaire to complete. The interview should last about an hour and you'll be given £10 for taking part.

General Probes:
How does this make you feel?
Can you explain that a bit more?
What do you mean by that?
Why do you think this is?
Can you give me a specific example?
Could you tell me a bit more about….?

Cannabis users; currently using/ abstinent:

Context of first use and patterns of cannabis use from onset to present day:

● What can you tell me about the first time you tried cannabis?
Prompt: What context was it in? How old where you?

● Who were you with? Where were you?

● Was it the first opportunity you had ever had to use cannabis? If not, why did you say no the first time?
Prompt: Can you tell me a bit more about how you came to be offered cannabis?/ How you came into contact with it? Why did you try cannabis when you did?

● What did you think of cannabis the first time you tried it?
Prompt: Did you like it? If yes why, if not why not? How did it make you feel?

● How frequently did you smoke cannabis in the beginning?

● At what age did you become a regular user (if you did) and why?

● Were you at any time using more frequently than you are now? If so for how long, and why did you reduce your intake (or stop altogether)? If not why did you not become a more frequent user?

● What are the reasons that you use cannabis now/or continued to use cannabis? Did you use cannabis for different reasons in the beginning?

Smoking Behaviour:

● Do/Did you usually smoke on your own or with others? Is there a reason for this?

● What percentage of the time do you smoke on your own, socially (in a group) or with your partner?

● Has the context in which you usually smoke cannabis changed over time? (i.e. when you first started it was always a group activity but now you smoke more often on your own?)

Dependence:

● Do/Did you feel you are/were dependent on cannabis? If so why, if not why not?

● Have you ever had any periods of abstinence? If so why? (What made you change)? Was it easy to abstain? Were there any effects of abstaining?
Prompt: When did you stop? How did you feel about cannabis when you decided to stop? What role did cannabis play in your life when you decided to stop?

● Do/did you feel you have/had become tolerant to the effects of cannabis? What effect/ consequence (if any) did this have?
Prompt: What made you think you had become tolerant- ask for examples. Did this lead to changes in your use of cannabis?

● Have you ever had or wanted to have help for your cannabis use?

● Have you ever felt guilty about your use of cannabis?

● What would make/made you think about stopping?
Prompt: have you ever thought about stopping? Why was this?

● Abstinent users: How has stopping use of cannabis affected you?
Prompt: How did using cannabis affect you? Has this changed since stopping?

Positive and negative effects of cannabis:

● Do you think there are any positive effects of using cannabis?

● Do you think there are any negative effects of using cannabis?

Effects of cannabis on personal relationships/ social networks:

● Did your parents know when you were first using cannabis? If so did it affect your relationship with them (positive or negative)?

● If your parents did not initially know, do they know now? If so has it had an effect on your relationship (positive or negative)?

● Has cannabis use ever affected a personal relationship (positive or negative)? If so in what way? How does this make you feel?

Non-users

General attitudes and perceptions of cannabis:

● What do you think influences people to try cannabis for the first time? Why do you think this is important/ influential?

● What do you think influences people to continue to use cannabis? Why do you think this is important /influential?

Personal experience of cannabis:

● Have you ever had the opportunity to try cannabis? If yes, what influenced your decision? If not how do you think you would react if you did have the opportunity?
Prompt: Who were you with? How old were you? Can you describe how you felt when you were offered cannabis?

● (PT) Do you think there are any positive or negative effects of using cannabis?

● What effect do you think it would have on you if you used cannabis?
Prompt: What do you think the possible positive and negative effects might be? What impact would using cannabis have on your life? How would friends/family feel? What consequence would it have?

APPENDIX IV

PUBLISHED PAPER

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Cannabis use and abstention in first-episode psychosis: the participants' view

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(*Accepted 16 December 2011*)

Cannabis use has been identified as a prognostic factor for poor outcome in first-episode psychosis (FEP). The research aimed to understand the factors that motivate or inhibit the use of cannabis in people with first-episode psychosis. Thirty first-episode psychosis patients (18 cannabis users and 12 abstainers) were interviewed using qualitative semi-structured methods in order to investigate the self reported factors perceived to influence cannabis abstention, initiation, continued use and consumption change. Interviews were transcribed verbatim and analysed using grounded theory based methods. Psychosis specific reasons were not found to be motivationally salient for the initiation or continued use of cannabis, but were found to be important for decreased consumption and cessation. Mental health concerns, such as the impact of cannabis on relapse and psychotic symptom exacerbation were also found to motivate abstention. Psychosis related reasons do not appear to motivate the initial or continued use of cannabis, although the deleterious effect of cannabis to mental health may promote decreased cannabis consumption, cessation and abstinence following the onset of psychosis. Therefore substance use early interventions for this population should aim to increase emphasis on the potential harms of cannabis to mental health.

Keywords: cannabis; first-episode psychosis; qualitative; reasons for use