

**Self-help for psychosis: Efficacy and the potential of sleep disturbance as a new target for intervention**

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# Abstract

**Background:** The present thesis addresses two issues. First, little research has explored the potential of targeting sleep difficulties to reduce the impact of symptoms of psychosis. Second, while self-help interventions are widely used for common mental health problems and sleep difficulties, they are underdeveloped with respect to psychosis.Therefore, the present thesis investigates the potential of sleep difficulties, specifically insomnia, as a target for self-help interventions designed to reduce an experience that is often associated with psychosis; namely, paranoia. **Method:** Meta-analysis was used in Chapter 3 to quantitatively synthesise the efficacy of extant self-help interventions for psychosis. Following this, Chapter 4 explored the link between sleep difficulties and paranoid thinking using structural equation modelling and multiple regression. Finally, Chapter 5 describes a randomised controlled trial designed to investigate the impact of an online, self-help intervention for insomnia on paranoid thinking. **Results:** Chapter 3 revealed that, on average, self-help interventions have a small-to-medium sized effect on the symptoms of psychosis and a small-sized effect on associated outcomes. Chapter 4 found that self-reported delayed sleep onset, but not sleep maintenance, was associated with increased paranoia. Further analysis revealed that this relationship was fully mediated by negative affect. Chapter 5 found significant reductions in insomnia, negative affect and paranoia in those who received the self-help intervention when compared to those in the wait-list control group immediately post-intervention. **Conclusions:** The research described in this thesis suggests that; (i) self-help interventions are a viable intervention option for experiences of psychosis; (ii) sleep difficulties are associated with negative affect and, in turn, the experience of paranoia; and (iii) sleep difficulties are a possible target for self-help interventions designed to reduce paranoid thinking.

# Publications, presentations and posters

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# An introduction to psychosis and approaches to intervention

This opening chapter intends to achieve three aims; (i) to describe the experience of psychosis; (ii) to conceptualise the experience of psychosis within a continuum model framework; and (iii) to introduce sleep as a possible target for intervention in order to reduce a common symptom of psychosis, paranoia.

## What is psychosis?

Psychosis is a highly variable experience; however it typically involves a loss of contact with reality. This loss of contact is generally associated with what are called ‘positive symptoms’ (a sensory perception experienced in the absence of an external stimulus, Silbersweig et al., 1995) and is primarily the result of (i) hallucinations and/or (ii) delusions. In addition to positive symptoms, those experiencing psychosis may also display negative symptoms (e.g., withdrawal or lack of thoughts, feelings, and behaviors that are usually present, Sommers, 1985). Finally, psychotic experiences are often concomitant with other factors such as reduced quality of life and functioning. This first section will outline, and delineate between, these three factors that define the experience of psychosis.

### Hallucinations

Attempts to define the distinctive features and characteristics of hallucinations highlight the variety of experiences that can be defined as hallucinations. Consequently Bentall (1990) advocates a broader approach to defining hallucinations. Namely, as "any percept-like experience which (a) occurs in the absence of an appropriate stimulus, (b) has the full force or impact of the corresponding actual (real) perception and (c) is not amenable to direct and voluntary control by the experiencer" (Bentall, 1990, p. 82). Hallucinations can occur in all sensory modalities and are experienced by around 70% of those with a schizophrenia diagnosis (Sartorius et al., 1986). Hallucinations may be tactile, in which an individual perceives a physical sensation such the feeling of being touched (Kathirvel & Mortimer, 2013). Hallucinations can also be olfactory, whereby an individual will detect smells that are not present in the environment (Greenberg, 1995), a phenomenon experienced by around 11% of those with a formal schizophrenia spectrum diagnosis (Mueser, Bellack, & Brady, 1990). A further hallucinatory experience are gustatory hallucinations, which refer to the experience of taste in the absence of an appropriate stimulus (Brasic, 1998). However, tactile, olfactory and gustatory hallucinations are reported relatively infrequently when compared to visual (a false perception of a visual stimulus) and auditory (a false perception of sound) hallucinations which are by far the most prevalent hallucinatory experiences (Chaudhury, 2010). For example, Bauer et al. (2011) investigated the prevalence of hallucinations in over 1000 participants with a schizophrenia diagnosis recruited from seven different countries. Bauer et al. reported that the most prevalent hallucinatory experience was auditory hallucinations (75%) followed by visual hallucinations (40%), with tactile, olfactory and gustatory hallucinations reported much less frequently (1.3% to 6.6% prevalence).

### Delusions

Delusions are strongly held beliefs which are maintained despite a lack of evidence and often in the face of evidence to suggest the contrary (Bentall, Corcoran, Howard, Blackwood, & Kinderman, 2001). Delusional experiences are often complicated and vary in content from person to person (Bell, Halligan, & Ellis, 2006). However, there are several distinct categories that often emerge including; (i) persecutory delusions ("a belief that harm is occuring, or is going to occur" and that "the perpetrator has the intention to cause harm", Freeman & Garety, 2000, p. 412), somatic delusions (beliefs related to a physical or bodily origin) and delusions of grandeur (an exaggerated belief in one’s own importance, knowledge or power). For example, Rhodes and Jakes (2000) conducted a qualitative investigation into the delusion experiences of those with a psychosis spectrum disorder, reporting that some delusions were persecutory (e.g. “the ministry of defence are trying to drive me mad” p. 219), others were tactile/somatic (e.g. “I believe that in 1995, insects and spiders were crawling through me” p. 218) while others were grandiose in nature (e.g. “I can communicate with aliens and have special powers” p. 216) (for more examples see Table 1). In terms of prevalence, Appelbaum, Robbins, and Roth (1999) investigated delusional experiences in a sample of 1136 people with a variety of psychiatric diagnoses. Of the total sample, 324 had self-reported experiences of delusions with the vast majority of these people having a psychosis spectrum diagnosis (73%). Most of the delusional experiences were persecutory in nature (78%), followed by delusions of mind/body control (60%) and grandiose delusions (34%).

Table 1

*Commonly Reported Themes of Clinical Delusions (adapted from Bell, Halligan, Peter & Ellis, 2006)*

**Theme Example**

***Defined by DSM***

 Persecutory *“My food is being poisoned by the police”*

 Grandiose *“I have the power to heal all illnesses”*

 Jealous (Otello syndrome) *“My partner is cheating on me”*

 Erotomanic *“A famous pop star secretly signals her love to me over the radio”*

Somatic *“I am infected by tiny parasites”*

Bizarre *“My mother’s thoughts are being carried on raindrops that fall on the air conditioner”*

***Misidentification***

 Capgras syndrome *“My relatives have been replaced by identical imposters”*

 Fregoli syndrome *“The same person is disguising himself as others”*

Reduplicative paramnesia “My present location exists in two places simultaneously”

 Mirror self-misidentification “*The reflection in the mirror is another person*”

***Other***

 Thought insertion/withdrawal *“Thoughts are being inserted into and/or withdrawn from my mind”*

 External control *“My mind and/or body is being controlled by an external agent”*

 Guilt *“I am responsible for the AIDS epidemic”*

 Religious *“I am the reincarnation of Solomon”*

 Cotard delusion *“I am dead/do not exist,” or “My body is decaying”*

### Negative symptoms

The term ‘negative symptoms’ originated more than 100 years ago in the field of neurology (Jackson, 1904) and was used to refer to “an essential loss, or diminished level of normal function across the domains of movement, cognition and emotional states” (Winograd-Gurvich, Fitzgerald, Georgiou-Karistianis, Bradshaw, & White, 2006, p. 313). More specifically, this loss of function can occur in up to five areas; blunted affect (a lack of emotional reactivity), alogia (a poverty of speech), anhedonia (an inability to feel pleasure), avolition (decreased motivation), and asociality (lack of interest in socialising) (Blanchard, Horan, & Collins, 2005; Kirkpatrick, Fenton, Carpenter, & Marder, 2006; Makinen, Miettunen, Isohanni, & Koponen, 2008). Negative symptoms are common in those experiencing psychosis (Boonstra et al., 2012) with studies reporting prevalence rates of between 20% and 45% (Herbener & Harrow, 2001; Malla et al., 2004; Malla et a l., 2002; Poguegeile & Harrow, 1985).

Negative symptoms have been largely understudied relative to positive symptoms (Earnst & Kring, 1997), however they have a prominent impact on the lives of those experiencing them. For example, several longitudinal studies support the notion that negative symptoms are important predictors of quality of life in those experiencing psychosis symptoms (Ho et al., 1998; Priebe, Roeder-Wanner, & Kaiser, 2000) while Wegener et al. (2005) reported that 43% of the variance in quality of life measures amongst those with psychosis can be explained by levels of depression, general psychopathology and negative symptoms. Negative symptoms have also been shown to be associated with cognitive deficits. For example, Heydebrand et al. (2004) investigated cognitive functioning in 307 people experiencing a first episode of psychosis. The authors reported that increased severity of negative symptoms was associated deficits in memory, verbal fluency, psychomotor speed and [executive function](http://www.sciencedirect.com/science/article/pii/S0920996403000975#200000205). In summary, negative symptoms are prevalent in those experiencing psychotic symptoms and impact quality of life (Priebe et al., 2000), cognition (Addington, Addington & Matickatyndale, 1991) and everyday functioning (Milev, Ho, Arndt, & Andreasen, 2005; Rabinowitz, Berardo, Bugarski-Kirola, & Marder, 2013).

### Quality of life and functioning

“Quality of life (QoL) is an elusive concept” (Felce & Perry, 1995, p. 51). Indeed, Liu (1976) commented that there are as many definitions of quality of life as there are people, a statement which frames quality of life as a personal and varied concept meaning different things from one person to another. Although there is much disagreement on operational definitions of quality of life (Aaronson et al., 2002; Gill & Feinstein, 1994), there is considerable overlap in the dimensions that researchers assess. Felce and Perry (1995) reviewed quality of life instruments in a bid to identify the essential components. The authors identified five core dimensions of QoL that the majority of measures share; (i) *physical wellbeing* (e.g., health & fitness); (ii) *material wellbeing* (e.g., financial security, possessions etc.); (iii) *social wellbeing* (e.g., breadth and depth of relationships); (iv) *emotional wellbeing* (e.g., affect or mood, fulfilment, self-esteem etc.); and (v) *development and activity level* (e.g., the possession and use of skills, work, education etc.).

Many of the dimensions of QoL described above are diminished in those experiencing psychosis. For example Saarni et al. (2010), in a population study of over 8000 people, reported that those experiencing psychosis spectrum disorders scored lower on measures of quality of life than those with no psychosis experience. This finding was supported by a recent meta-analysis by Fusar-Poli et al. (2015) who compared both functioning (work performance, interpersonal relations etc.) and QoL between those at high risk of psychosis and healthy controls. Fusar-Pioli et al. reported large and significant impairments in functioning and QoL across the at risk group when compared to the control groups. Diminished functioning and quality of life in those experiencing psychosis has been strongly linked to the presence of depressive, or negative symptoms. For example, Saarni et al. (2010) reported that those with schizoaffective type disorders experienced the largest loss of QoL with depressive symptoms explaining most of the reduction in QoL measures, a finding which has been supported elsewhere (Renwick et al., 2012; Wegener et al., 2005).

## The psychosis continuum

The experience of psychosis has historically been treated as dichotomous; that is, the symptoms of psychosis are viewed as either present or not. This approach has its roots in the notion of psychiatric diagnosis (Kraepelin, 1919) and has dominated psychiatry and psychosis research for decades. Many consider the dichotomization of psychosis experience useful for both diagnosing psychosis and for medical decision-making (Rose, 1992). However, in the last few decades, an alternative approach has emerged that views psychosis as the extreme end of a continuum of functioning. The present thesis adopts this continuum approach; therefore this section will outline this approach along with evidence to support its use.

### What is the psychosis continuum

The continuum approach posits that the same symptoms of psychosis often seen in those with a diagnosis of a psychotic disorder (e.g. paranoia) are also evident in non-clinical populations. Furthermore, that these experiences themselves are on a continuum, to the extent that people can feel more or less paranoid on one day compared to the next, and more or less paranoid than others. This expression of psychosis in the general population is a longstanding concept and is often referred to as psychotic-like experiences (PLEs), psychosis-proneness, and/or Schizotypy. A continuum approach to psychosis, therefore, assumes that the experience of symptoms of psychosis such as hallucinations and delusions is not necessarily associated with the presence of a clinical disorder (van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009). Whether the experience of psychosis symptoms is considered a clinical disorder is dependent on numerous factors, including the intrusiveness and frequency of symptoms along with personal and cultural factors such as coping ability, societal tolerance and the degree of developmental impairment and distress caused (Johns & van Os, 2001). Consequently, the number of people experiencing hallucinations and delusions is higher than the prevalence of clinical disorders associated with psychosis symptoms.

### Psychosis symptoms are seen in the general population

A key test of the continuum model is to investigate whether the symptoms of psychosis often seen in clinical populations are also present in the general population. In support of this idea, numerous epidemiological studies have provided compelling evidence for the existence of psychosis symptoms in the general population (Eaton, Romanoski, Anthony, & Nestadt, 1991; Kendler, Gallagher, Abelson, & Kessler, 1996; Ohayon, 2000; Poulton et al., 2000; Tien, 1991). For example, van Os, Hanssen, Bijl, and Ravelli (2000) administered the Composite International Diagnostic Interview (CIDI: Robins et al., 1988) to a random sample of over 7000 participants taken from the general population. The authors reported that 17.5% of the sample (*N* = 1237) reported experiences resembling psychosis (hallucinations and/or delusions), while 4.2% had evidence of psychiatrist rated delusions or hallucinations (assessed over the phone using a clinical interview). The authors suggest that the psychosis phenotype may be 50 times more prevalent than the more restricted medical concept (17.5% sample prevalence of psychosis experiences divided by the schizophrenia prevalence of 0.4%, van Os et al., 2000). Nine years later, van Os et al. (2009) conducted a meta-analysis of all studies investigating the prevalence and incidence of psychotic experiences in the general population (47 studies yielding 217 estimates of the 1 year prevalence or incidence of psychosis like symptoms). This analysis revealed a median prevalence rate of psychosis like experiences in the general population of 5% (total number experiencing symptoms), and a median incidence rate of 3% (number of newly reported psychosis experiences within the year). Further analysis revealed that 75 – 90% of psychotic experiences in the general population were transitory and faded over time. However, the authors concluded that these transitory psychotic experiences may become abnormally persistent and subsequently may develop into more serious, clinical forms depending on the presence of risk factors.

### Experiences in the general can inform clinical models of psychosis

The symptoms of psychosis are, therefore, not only seen in clinical groups, but are also distributed throughout the general population. Consequently, investigating psychosis like symptoms in the general population, along with the factors moderating their expression, may help to understand psychosis at both clinical and non-clinical levels. Verdoux and van Os (2002) likened this approach to research strategies investigating risk factors for atherosclerosis in people with severe stroke or massive myocardial infarction. Research efforts exploring the moderating effects of cholesterol or blood pressure in the general population have been integral to elucidating the pathophysiology of atherosclerosis and for developing preventive treatments. However, before this approach can be used in relation to psychosis, it is important to ascertain whether psychotic experiences in the general population (psychosis proneness) are to psychotic diagnoses what hypertension and blood pressure are to myocardial infarction. In other words, can proneness to psychosis predict transition to more clinical presentations and formal diagnoses of psychosis?

 Chapman, Chapman, Kwapil, Eckblad, and Zinser (1994) were the first to address this question, reporting high rates of clinically relevant psychotic outcomes in those scoring highly on measures of magical ideation and perceptual aberration ten years earlier. Poulton et al. (2000) reported the longest longitudinal study to date, with experiences on the psychosis continuum measured in 761 children and then again 15 years later in adulthood. The authors reported that children reporting psychosis like symptoms at age 11 were 16 times more likely to have a diagnosis of psychosis at age 26 when compared to those without psychosis like symptoms at age 11. Hanssen, Bak, Bijl, Vollebergh, and van Os (2005) used the CIDI to assess subclinical symptoms of psychosis in 7076 people, then again one and two years later. After two years, those experiencing psychotic symptoms at baseline had a 60 fold increased risk of transition to a clinical psychotic disorder when compared to those without psychotic symptoms (representing an 8% transition rate). This risk increased to 21% for those with multiple psychosis-like experiences at baseline. Psychosis-like symptoms are present in the general population (van Os et al., 2000; Verdoux & van Os, 2002) and can predict future transition to clinical levels of psychosis (Hanssen et al., 2005; Poulton et al., 2000; van Os et al., 2009). Consequently, “the causes of and pathways to clinical psychotic disorder can be studied long before the disorder becomes clinically relevant” (Rossler et al., 2007, p. 1).

### The single symptom approach to psychosis research

Modern psychiatry, and research into psychosis, has been strongly influenced by the prominent German psychiatrists of the early 20th Century. For example, in 1883 Emil Kreapelin, widely known as the founder of modern psychiatry, proposed that psychotic disorders could be conceptualized as biological illnesses, and therefore could be categorized (Kraepelin, 1883). In nine successive editions of ‘the textbook of psychiatry’ (Kraepelin & Lange, 1927), Kreapelin outlined a nosological system of mental illness classification that would go on to influence psychiatry and inform the creation of the Diagnostic and Statistical Manual (DSM; American Psychological Association, 1952). Within this system, Kreapelin categorized psychotic illness as either ‘dementia praecox’ (which the Swiss psychiatrist, Eugen Bleuler, would later name Schizophrenia) or manic-depressive psychosis (now called bipolar-disorder). This classification of symptoms into broader categories has dominated clinical practice and mental health research, and has gone relatively unchallenged.

However, efforts using this categorical paradigm have rarely yielded replicable findings, and some have argued that the paradigm has limited genuine advancement in psychosis research (Bentall, 2006). Many researchers have argued that this stalled advancement is, in part, due to the adoption of poorly defined notions of psychosis (Bentall, 2006; Bentall, Jackson, & Pilgrim, 1988; Craddock & Owen, 2005; Linscott & van Os, 2010). An alternative to the categorical approach to psychosis has emerged over the past few decades; namely, the symptom-orientated approach. The symptom-orientated approach asserts that, rather than grouping the symptoms of psychosis together to form diagnostic categories, researchers should instead focus on specific symptoms. For example, researchers should study aspects of hallucinations (auditory, visual etc.) and delusions (paranoia, grandeur etc.) rather than umbrella concepts such as schizophrenia, bipolar disorder etc. The present thesis will adopt the symptom-orientated approach to psychosis research by focusing research efforts on a common experience of psychosis, paranoia.

## Paranoia as the focus of the present thesis

So far the present thesis has broadly considered experiences that are often synonymous with psychosis, namely hallucinations and delusions, negative symptoms and associated factors such as quality of life. The focus of the present thesis will now narrow to mainly (but not exclusively) consider the experience of paranoia, a common delusional experience seen in both the general population and in those with a diagnosis of psychosis.

### What is paranoia?

Freeman and Garety (2000) propose that individuals experiencing paranoia believe “that harm is occurring, or is going to occur, to him or her” and “that the persecutor has the intention to cause harm” either physical or psychological (p. 412). For example, Stopa, Denton, Wingfield, and Taylor (2013) used a qualitative methodology to explore the thoughts of those experiencing persecutory delusions. Some thoughts were concerned with physical harm - e.g., “*Well, it was just going outside and people were gonna be there waiting for me...and they’re going to attack me and leave me sort of unconscious* (p. 194), whereas others reported being paranoid about the threat of psychological harm – e.g., “*I thought they were talking about me in the other room… I thought he was making plans to make me look stupid*” (p. 194). Paranoia is a common feature of many psychiatric conditions, particularly psychotic disorders and is often categorized as a delusion (Kendler, Karkowski, & Walsh, 1998; McGrath et al., 2004).

### Paranoia in the general population

Evidence suggests that paranoid thoughts are relatively common, even amongst the general population. For example, Ellett, Lopes, and Chadwick (2003) reported that 47% of a sample 324 college students, reported an episode of paranoid thinking that involved a clear belief that someone intended to cause harm to them. Freeman et al. (2005) used a range of measures to investigate the experience of paranoia in a non-clinical sample of 1202 participants. Freeman et al. reported that paranoid thoughts occurred in approximately one third of the sample, with less frequently experienced paranoid thoughts being more strongly believed and causing more distress to the individual. Interestingly, Freeman et al. reported that paranoid experiences appeared to be arranged hierarchically, that is that more severe paranoid thoughts built on common emotional concerns. This proposed hierarchy is illustrated in Figure 1 where concerns at the bottom of the pyramid (e.g. fears of rejection) provide a platform from which ideas of reference (e.g., people are talking about me) and more serious perceptions of threat (e.g., people are going out of their way to hurt me) can build.

Figure 1

*The Paranoia Hierarchy (taken from Freeman et al., 2005)*



This hierarchy of paranoia is reflected in data taken from national surveys of the general population such as the Adult Psychiatric Morbidity Survey (McManus, Meltzer, Brugha, Bebbington, & Jenkins, 2009) which asks three questions from the Psychosis Screening Questionnaire (PSQ; Bebbington & Nayani, 1995). Freeman et al. (2011) reported that 18.6% of 7281 participants endorsed the first item from the PSQ, “*over the past year, have there been times when you felt that people were against you?*”. However, fewer participants (8.2%) endorsed the second item which assesses more pronounced paranoid thoughts, “*have there been times that you felt that people were deliberately acting to harm you or your interests*. The third item of the PSQ represents severe paranoid thinking, “*have there been times you felt that a group of people was plotting to cause you serious harm or injury?*”, and was endored by just 1.2% of the sample. Paranoia, therefore, is present throughout the population, but ranges from milder expressions (e.g., people at work are talking about me) to more serious paranoid thoughts often seen in clinical groups (e.g., my food is being poisoned by the police).

## Psychological interventions for psychosis

Over the past few decades, there has been a considerable amount of research into the use of psychological interventions for those experiencing the symptoms of psychosis (Haddock & Lewis, 2005). Although pharmacological interventions are often used in those with formal diagnoses of psychosis, the nature and efficacy of such interventions is beyond the scope of the present thesis. Consequently, this section will describe two of the main psychological approaches to intervention used to manage the symptoms of psychosis; cognitive behavioural therapy and family based interventions.

### Cognitive behavioural therapy (CBT)

According to Dobson (2010), interventions based on the principles of CBT share three fundamental foundations; (i) cognitive activity (e.g. thought processes) affects behaviour; (ii) cognitive activity can be monitored and altered; and (iii) a desired behaviour change may be achieved through changes in cognitive activity. Interventions based on the principles of CBT are one of the most extensively researched psychological interventions for a wide range of mental health complaints (for a review see Butler, Chapman, Forman, & Beck, 2006). For example, CBT has been shown to be efficacious for common mental health problems such as depression (Butler et al., 2006; Dobson, 1989; Reinecke, Ryan, & DuBois, 1998) and anxiety (Hofmann & Smits, 2008; Stewart & Chambless, 2009), as well as for eating disorders (Duchesne et al., 2007; Fairburn et al., 2009), pain management (Morley, Williams, & Hussain, 2008; Tatrow & Montgomery, 2006) and anger management (Beck & Fernandez, 1998). CBT has, therefore, shown itself to be a flexible intervention option for a range of problems. One application of CBT that has grown in recent years its use in those experiencing the symptoms of psychosis.

There has been a proliferation of randomised controlled trials investigating the efficacy of cognitive behavioural therapy for psychosis (CBTp) on both symptoms and associated outcomes such as quality of life. From early meta-analytic reviews of CBTp (Gould, Mueser, Bolton, Mays, & Goff, 2001; Pilling et al., 2002; Rector & Beck, 2001), to more contemporary investigations (Burns, Erickson, & Brenner, 2014; Hutton & Taylor, 2014; van der Gaag, Valmaggia, & Smit, 2014), CBTp is now seen as a credible and effective intervention for the symptoms of psychosis. For example, van der Gaag et al. (2014) reported the results of a meta-analysis investigating the use of CBTp to reduce hallucinations and delusions, concluding that CBTp was associated with significant symptom reductions. Furthermore, Burns, Erickson, & Brenner (2014) used meta-analysis to investigate the efficacy of CBTp for those resistant to medication, reporting a medium sized effect on the positive and general (overall psychopathology) symptoms of psychosis. Finally, Hutton and Taylor (2014) conducted a systematic review and meta-analysis of studies investigating the effectiveness of CBTp in preventing transition to psychosis when compared to control groups. Hutton and Taylor reported that CBTp was associated with a reduced risk of transition to psychosis as well as reduced symptoms of psychosis. Although some researchers have voiced concerns about potential sources of bias in effect size estimates (e.g. inadequate blinding and randomisation, see Jauhar et al., 2014), CBTp has continued to develop and is now offered as part of national intervention strategies for the symptoms of psychosis in the United Kingdom (National Institute for Health and Care Excellence, 2014).

### Family based interventions

In 1972, an influential study was published showing that those experiencing symptoms of psychosis from families that express high levels of criticism, hostility or emotionally overinvolved attitudes (collectively referred to as high ‘expressed emotion’) have more frequent relapses than those experiencing psychosis from less emotionally expressive families (Brown, Birley, & Wing, 1972). This work has since been replicated and the concept of expressed emotion (EE) is now considered a reliable predictor of relapse in those experiencing psychosis (Amaresha & Venkatasubramanian, 2012; Butzlaff & Hooley, 1998). Consequently, there have been substantive efforts to develop psychosocial interventions designed to reduce levels of expressed emotion in the families of those experiencing psychosis. These family based interventions are varied, often consisting of different strategies and may or may not include the involvement of the individual experiencing the symptoms of psychosis. However at their core they aim to; (i) reduce the level of burden and stress felt by the family of those experiencing the symptoms of psychosis; and (ii) enhance the capacity of family members and caregivers to anticipate and solve problems associated with the experience of psychosis.

For example, Leff, Kuipers, Berkowitz, Eberleinvries, and Sturgeon (1982) investigated the effiacy of a family based intervention consisting of three elements; (i) an educational element designed to elucidate the symptoms of psychosis along with startgies for managing them; (ii) a relatives group that brought high and low EE families together in a bid to provide a support network; and (iii) one-to-one sessions between mental health professionals and the families of those experiencing psychosis. Leff et al. reported significant reductions in both expressed emotion and relapse rate (9% relapse rate in the family intervention group compared to 50% relapse in the control group). Subsequent studies have confirmed these findings using meta-analysis (Mari & Streiner, 1994; Pilling et al., 2002). For example, Pharoah, Mari, Rathbone, and Wong (2010) conducted the most recent and comprehensive meta-analytic review of 53 RCTs investigating the efficacy of family interventions for those experiencing the symptoms of psychosis. Pharaoh et al. concluded that such interventions significantly reduced levels of expressed emotion in families and provided reduced relapse rates and hospital admissions alongside a reductions in the symptoms of psychosis and improved social functioning (see also Pitschel-Walz, Leucht, Bauml, Kissling, & Engel, 2001). Family based interventions aiming to develop more robust coping strategies and reduce the stress often associated with having a loved one who is experiencing psychosis is associated with reduced relapse rates as well as improved symptomatic and functional outcomes. Consequently, much like CBTp, family based interventions are offered to those experiencing the symptoms of psychosis as part of national intervention guidelines in the UK (National Institute for Health and Care Excellence, 2014).

## Sleep difficulties as a viable target for intervention

In recent years there have been attempts to reduce psychopathology indirectly by modifying associated factors. Sleep difficulties such as insomnia have been posited as one such factor for two reasons; (i) sleep complaints and mental health are often concomitant with psychopathology; and (ii) improving sleep quality has been shown to improve mental health outcomes. This section will introduce sleep difficulties as a transdiagnostic process in mental health. That is, sleep is aetiologically central to mental health and could be a viable target for preventative intervention for those experiencing the symptoms of psychosis.

### Sleep difficulties and mental health are symbiotic

Sleep and mental health complaints go hand-in-hand, with problems sleeping associated with many, if not all psychiatric conditions. For example, Ford and Kamerow (1989), reported the findings of the National Institute of Mental Health Epidemiologic Catchment Area Study in which almost 8000 people from a community sample were questioned about sleep complaints and mental health problems at baseline, and then again one year later. Ford and Kamerow reported that 40% of those with insomnia (defined as difficulty initiating and/or maintaining sleep), and 47% of those with hypersomnia (defined as excessive daytime sleepiness), had a psychiatric disorder, compared to only 16% of those without any sleep complaints. Furthermore, a meta-analysis of 177 studies investigating sleep and psychiatric conditions by Benca, Obermeyer, Thisted, and Gillin (1992) reported that sleep difficulties were associated with a range of mental health problems including depression, anxiety, personality disorders and schizophrenia, when compared to controls.

Problems sleeping have traditionally been viewed as a secondary consequence of a primary mental health complaint (e.g., insomnia has been viewed as a consequence of anxiety). However, more contemporary views conceptualise sleep difficulties as not simply a symptom of psychopathology, but rather a disorder it its own right (Lichstein, 2006; McCrae & Lichstein, 2001). Moreover, insomnia is now recognised as having an integral role in the onset and course of mental health complaints. For example, Baglioni et al. (2011) conducted a meta-analysis of 21 longitudinal studies investigating the relationship between insomnia and symptoms of depression. Baglioni et al. reported that non-depressed people with insomnia at baseline were twice as likely to develop depression compared to those with no sleep complaints, pointing to a causal role for insomnia in depression (see also Ford & Kamerow, 1989).

### Improving sleep benefits mental health

The notion that sleep problems have a causal impact on mental health problems, as well as the prospect that they could provide a viable target for preventive intervention, could be strengthened by studies that seek to improve sleep quality as a means to improving mental health. Although the evidence to date is fairly preliminary, there is evidence to suggest that interventions designed to target insomnia can lead to improvements in a variety of mental health complaints (for a review see Taylor & Pruiksma, 2014). For example, Manber et al. (2008) randomised participants with Major Depressive Disorder (MDD) to receive either 7 sessions of cognitive behaviour therapy for insomnia (CBTi) in addition to medication or medication only. Manber et al. reported higher rates of remission in the intervention group on measures of insomnia (50% vs. 7.7%) and depression (66% vs. 33%) when compared to the control group, concluding that interventions targeting insomnia can enhance remission rates in those with depression; a finding that is independent of the severity of depression (Manber et al., 2011) and that has beneficial implications for quality of life (Shimodera et al., 2014). Furthermore, in a meta-analysis of 216 trials of CBTi, Belleville, Cousineau, Levrier, and St-Pierre-Delorme (2011) reported a small-to-medium sized effect of CBTi on anxiety symptoms (*d*+ = 0.41). Improving sleep difficulties such as insomnia, can therefore, lead to improvements in mental health complaints.

### Can improving sleep ameliorate psychosis symptoms?

The close association between sleep difficulties and mental health, alongside the beneficial effects of improving sleep quality in those with mental health complaints suggests that sleep might be a viable target for interventions designed to reduce experiences related to psychosis. However, the majority of extant literature investigating sleep difficulties as a target for intervention has tended to be concerned with affective, common mental health problems such as depression and anxiety. However, sleep complaints are also prevalent among those with both formal diagnoses of psychosis and those with psychotic like experiences (PLEs). For example, those with a formal diagnosis of psychosis have been shown to have a variety of sleep difficulties including problems initiating and staying asleep, decreased total sleep time, and reduced sleep efficiency (Chouinard, Poulin, Stip, & Godbout, 2004; Hudson et al., 1993; Keshavan et al., 1998; Lauer, Schreiber, Pollmacher, Holsboer, & Krieg, 1997; Monti & Monti, 2004; Tandon et al., 1992). Similarly, a close association between sleep difficulties and psychosis has been reported in general population groups (Fisher et al., 2014; Jeppesen et al., 2015; Lee, Cho, Cho, Jang, & Kim, 2012; Thompson et al., 2015), suggesting that sleep and psychosis are associated across the continuum of psychosis (Lunsford-Avery, LeBourgeois, Gupta, & Mittal, 2015; Lunsford-Avery & Mittal, 2013; Ruhrmann et al., 2010; Zanini et al., 2013).

Furthermore, there have also been successful attempts to improve psychosis symptoms by targeting sleep complaints (albeit fewer studies than for other common mental health problems). For example, Harvey et al. (2015) investigated the use of CBTi to improve mood state, sleep and functioning in those with bipolar disorder. The author’s randomised 58 participants to either an intervention group (who received 8 sessions of CBTi) or a control group (who received psychoeducation), and found that significant improvements in sleep were associated with significantly lower mania/hypermania relapse rates (4.6% vs. 31.6%) along with significantly fewer days spent in bipolar episodes (3.3 days vs. 25.5 days). Additionally, Bloch et al. (2010) reported the effects of using music relaxation to reduce the severity of insomnia on symptomatic and emotional outcome measures in people with a diagnosis of schizophrenia spectrum disorder. Bloch et al. reported that, after using the music relaxation technique before bed for 7 consecutive nights, both objective and subjective sleep complaints were reduced along with improvements in the symptoms of psychosis (assessed using the Positive & Negative Syndrome Scale, Kay, Fiszbein, & Opler, 1987) and associated emotional outcomes such as depression and quality of life.

## Conclusion

The experience of psychosis is defined by three factors; (i) positive symptoms in the form of hallucinations and delusions; (ii) negative symptoms such as a loss of motivation and a reduced ability to experience pleasure; and (iii) associated factors such as reduced quality of life and functioning. It is not confined to clinical populations. Instead, the psychosis phenotype is distributed throughout the general population, and, therefore the study of such experiences in the general population can be informative, especially in elucidating how such experiences evolve at earlier stages. The present thesis is concerned with one particular common symptom of psychosis – namely, paranoia – and its relationship with one of the prominent correlates of psychosis; namely, sleep difficulties. This relationship will be studied in a non-clinical sample (in Chapter 4) before the notion of sleep as a transdiagnostic, early intervention target is put to the test using a self-help intervention designed to improve sleep (in Chapter 5). Given that the present research develops a self-help approach, Chapter 2 will provide an introduction to the use of self-help interventions for mental health problems, before Chapter 3 systematically reviews the efficacy of self-help interventions for psychosis using meta-analysis.

# Self-help interventions for mental health problems: An introduction

“*A massive, systematic, and yet largely silent revolution is occurring in mental health today and is gathering steam for tomorrow*” (Norcross, 2000)

 In the quote above, (Norcross, 2000) refers to the proliferation of self-help approaches for mental health conditions, an approach that has gathered momentum with practitioners, researchers, and policy makers placing an increasing emphasis on self-help for treating mental health problems (Lewis et al., 2003). Proponents of self-help interventions for mental health assert that such an approach has the potential to not only improve psychological outcomes, but also ameliorate burgeoning therapist waiting times and increase access to psychological therapies. Self-help, therefore, has the potential to be a vital tool for mental health services. This introductory chapter will use meta-analytic reviews of self-help interventions for common mental health problems to provide an overview of self-help efficacy and an introduction to the topic.

## ****What are self-help interventions?****

Self-help interventions have undergone a great deal of change over the years in what they are used for, what format they take and how they are delivered. Indeed definitions of self-help are generally not agreed on and differ from researcher to researcher. However for the purpose of this thesis, self-help interventions are defined as those that are “designed to be conducted predominantly independently of professional contact” (Bower, Richards, & Lovell, 2001). Self-help interventions can be administered through a variety of mediums such as face-to-face or group meetings, through computers, mobile, and online platforms. Self-help typically involves working independently through a guide that describes the steps to be taken in order to apply a psychological intervention. A slight variation is guided self-help, which is distinguished “by the support that is given by a professional therapist or coach to the patient when working through the standardized treatment” (Cuijpers, Donker, van Straten, Li, & Andersson, 2010, p. 1943). The support offered can range from assisting the person to work through the self-help program to emotional support and can be provided in a range of ways (e.g., face-to-face, telephone, or email). Most self-help interventions are based on standardized psychological treatments, with the most common interventions being those based on cognitive behavioural therapy (Cuijpers & Schuurmans, 2007).

## Do self-help interventions work?

Self-help interventions have been predominantly applied to common mental health problems such as depression and anxiety, with 19 different meta-analyses published between 1990 and 2015. This section will provide an overview of self-help efficacy based on these 19 meta-analyses. The majority of these studies reported either medium, or large effects of self-help interventions on the symptoms of depression and anxiety. For example, Scogin, Bynum, Stephens, and Calhoon (1990) published an early meta-analysis of self-help interventions using written and audiotape formats. Although this review suffered from a limited number of primary studies (4 pure self-help, 5 guided-self-help), the authors reported large effects of pure self-help for affective symptoms, with larger effects for guided interventions (although therapist led interventions were superior). Subsequent meta-analyses reported similar effect sizes when self-help was compared to wait-list controls (Cuijpers, 1997; Gould & Clum, 1993; Marrs, 1995). Self-help interventions for depression and anxiety, therefore, appear to be beneficial, at least when compared to no treatment control groups.

Despite the apparent efficacy of self-help, the low number of primary studies restricted conclusions from early reviews. These meta-analyses, and the researchers behind the preliminary research, did however catalyse the self-help ‘revolution’ that John Norcross referred to at the turn of the millennium (Norcross, 2000). Not only did the proliferation of self-help studies confirm the medium-to-large effect of such interventions for depression and anxiety with more comprehensive meta-analyses (Addington, Addington, & Matickatyndale, 1993; Den Boer, Wiersnia, & Van den Bosch, 2004; Farrand & Woodford, 2013; Gregory, Canning, Lee, & Wise, 2004; Hirai & Clum, 2006; Lewis, Pearce, & Bisson, 2012; Menchola, Arkowitz, & Burke, 2007), but that guided interventions were more effective than pure, unguided self-help (Gellatly et al., 2007; Haug, Havik, Ost, & Nordgreen, 2012; Spek et al., 2007). Moreover, whereas early meta-analyses demonstrated the superior efficacy of face-to-face psychotherapy over self-help (Scogin et al., 1990), more contemporary, and comprehensive reviews suggest that guided self-help interventions can be comparable to face-to-face psychotherapy (Cuijpers, Donker, et al., 2010). For an overview of meta-analyses investigating self-help for depression and anxiety see Table 2.

Table 2

*An Overview of Meta-Analysis Results of Self-Help Interventions for Depression and Anxiety*

**Author *k* Target symptoms Main comparisons Effect size (*d*) Lower 95% CI Upper 95% CI**

Scogin et al. (1990) 4 Affective symptoms Pure SH vs. wait-list .73 Not reported Not reported

 4 Pure SH vs. therapist -.48 Not reported Not reported

 5 Guided SH vs. wait-list 1.05 Not reported Not reported

 5 Guided SH vs. therapist -.20 Not reported Not reported

Gould et al. (1993) 3 Depression SH vs. wait-list .74 Not reported Not reported

Marrs (1995) 5 Depression SH vs. wait-list .57 .25 .89

 15 Anxiety SH vs. wait-list .91 .73 1.08

Cuijpers et al. (1997) 6 Depression SH vs. wait-list .82 .50 1.15

 4 SH vs. therapist .10 -.48 .28

Bower et al. (2001) 6 Depression & anxiety SH vs. TAU .41 .09 .72

den Boer et al (2004) 14 Depression & anxiety SH vs. wait-list .84 .65 1.02

 SH vs. TAU -.03 -.20 .14

Gregory et al. (2004) 17 Depression SH vs. wait-list .77 .61 .94

Anderson et al. (2005) 6 Depression & anxiety SH vs. controls 1.36 .96 1.76

Hirai et al. (2006) 33 Anxiety SH vs. controls .62 .52 .72

Gellatly et al. (2007) 34 Depression Pure & guided SH vs. controls .43 .30 .57

 24 Guided SH vs. controls .80 .58 1.01

Menchola et al. (2007) 20 Depression & anxiety SH vs. wait-list 1.00 .81 1.18

 9 SH vs. therapist -.31 -.59 -.03

 11 Depression SH vs. wait-list 1.28 1.03 1.53

 2 SH vs. therapist -.44 -1.04 .16

 9 Anxiety SH vs. wait-list .67 .40 .94

 7 SH vs. therapist -.27 -.59 .04

Spek et al (2007) 11 Depression & anxiety SH vs. controls .40 .29 .51

 6 Pure SH vs. controls .24 .11 .37

 5 Guided SH vs. controls 1.00 .75 1.24

 5 Depression SH vs. controls .27 .15 .40

 6 Anxiety SH vs. controls .96 .69 1.22

Ahmead et al. (2008) 7 Depression & anxiety SH vs. controls .47 -.07 1.00

Cuijpers et al. (2010) 24 Depression & anxiety Guided SH vs. therapist .02 -.20 .15

Haug et al. (2012) 54 Anxiety SH vs. wait-list or placebo .78 .67 .90

 28 SH vs. therapist -.20 -.37 .02

 14 Pure SH vs. wait-list/placebo .58 .34 .83

 40 Guided SH vs wait-list/placebo .85 .73 .98

Lewis et al. (2012) 20 Anxiety SH vs. wait-list .86 .69 1.03

 12 SH vs. therapist -.34 -.65 -.03

Farrand et al. (2013) 10 Depression SH vs. controls .49 .30 .66

 3 Anxiety SH vs. controls .37 -.06 .80

Cavanagh et al. (2014) 13 Depression SH vs. controls .37 .18 .56

 13 Anxiety SH vs. controls .33 .10 .56

Matcham et al. (2014) 23 Depression SH vs. controls .13 .02 .25

 20 Anxiety SH vs. controls .10 -.05 .11

*Notes*: *k* = number of comparisons, SH = self-help, TAU = treatment as usual.

Effect sizes are taken from the earliest time point with the vast majority being post-intervention.

Negative effect sizes favour the comparison condition while positive effect sizes favour self-help

## What factors moderate self-help efficacy?

Self-help interventions are effective in reducing common mental health problems when compared against control groups (Hirai & Clum, 2006; van't Hof, Cuijpers, & Stein, 2009) and have been shown to be more effective than treatment as usual (Bower et al., 2001) and comparable to face-to-face psychotherapy (Cuijpers, Donker, et al., 2010). However the efficacy of self-help interventions is much more nuanced, with several factors moderating the impact of self-help on mental health outcomes.

### Contact time

 Contact with a therapist, researcher, or peers is a key factor which has been shown to moderate the effect of self-help interventions. Self-help in its purest form requires no assistance. However, self-help can be supported and there is evidence that guided self-help programs are more effective than unguided self-help. For example, Gellatly et al. (2007) reviewed studies investigating the effects of self-help and guided self-help on depression, and found that the effect size almost doubled from *d*+ = 0.43 to *d*+ = 0.80 when only studies investigating the effects of guided self-help were included. Furthermore, Spek et al. (2007) in a meta-analysis of internet-based CBT for depression and anxiety, reported that effect sizes were 4 times as large for guided interventions compared with pure self-help. The finding that guided interventions offer additional efficacy over pure, unguided self-help has been well replicated (Haug et al., 2012; Lewis et al., 2012; Scogin et al., 1990), leading to the integration of guided self-help interventions into routine clinical practice (National Collaborating Centre for Mental Health, 2005).

### Intervention duration

How long a self-help intervention programme runs for is a further factor that can moderate treatment efficacy. For example, it could be the case that more self-help leads to increased efficacy through more exposure to self-help. Alternatively, it is possible that there may be an upper limit to self-help effectiveness in that participants may see most benefit at post-intervention before ceiling effects curtail any further progress. Gould and Clum (1993) investigated the impact of intervention duration of self-help interventions on a variety of outcomes, categorizing duration as (i) less than 1 week; (ii) between 1 and 8 weeks; and (iii) greater than 8 weeks. The authors reported an inverse relationship between intervention duration and effect size. The effects were strongest in studies that lasted less than 1 week (*d*+ = 1.62), followed by 1 to 8 weeks (*d*+ = 0.87), and finally interventions longer than 8 weeks (*d*+ = .36). This finding however stands alone in the self-help literature, particularly in more recent reviews that report either no effect of intervention duration or superior efficacy in longer interventions. For example Gregory et al. (2004) correlated intervention duration with effect size (weighted by sample size), finding no relationship. Similarly, Haug et al. (2012) looked at treatment moderators of self-help for anxiety disorders, concluding that intervention duration was not significantly related to outcome. However, Den Boer et al. (2004) reported that intervention effect sizes for longer treatment lengths were larger than those for shorter interventions, concluding that interventions of 8 weeks or more were the most effective.

### Symptom severity

Baseline symptom severity is a further factor that could moderate the impact of self-help interventions**.** For example, it could be the case that those with more severe symptoms may be beyond the reach of self-help interventions and instead require more intensive treatments. Alternatively, those with more serious symptoms may have the most room for improvement and see greater benefits of self-help interventions when compared to those with mild symptoms and less room for improvement. Previous reviews have often encountered difficulties examining symptom severity due to the variation of outcome measures used. However many reviews have used participant recruitment source as a proxy for symptom severity, the idea being that those recruited from clinical settings (outpatient clinics, GP referral etc.) may experience more severe psychological symptoms than those recruited from non-clinical settings (advertisements, student opportunity samples). Farrand and Woodford (2013) for example reviewed the effectiveness of written CBT self-help, concluding that self-help was associated with larger effects in community samples when compared to clinical sources. Haug et al. (2012) reported similar findings, with community recruitment associated with significantly greater self-help efficacy (*d*+ = 0.88) than clinical samples (*d*+ = 0.53), a finding mirrored in other meta-analyses (Gellatly et al., 2007; Scogin et al., 1990). Self-help interventions, therefore, appear to be more successful in ameliorating common mental health problems in those with milder complaints than those with more serious symptoms.

### Study quality

Factors relating to the quality of intervention research play a large part in determining the efficacy of self-help interventions mental health problems. Interventions that at first seem to be highly effective can later be found to be a product of poor study quality rather than genuine treatment efficacy. Of the 19 meta-analytic reviews of self-help interventions for common mental health problems, few have made comprehensive efforts to assess the moderating effect of study quality adequately. Scogin et al. (1990) for example simply discussed factors which the authors felt constituted good quality research, with no explicit rules for weighting the various factors before assigning a quality score on a 3-point scale (poor, mediocre or excellent). The authors found no relationship between study quality and self-help effectiveness for a range of psychological problems. Other researchers have operationalised study quality using proxies such as publication status or allocation method. Marrs (1995) for example compared self-help interventions published in peer-reviewed journals (assumed to be high quality) with unpublished studies (assumed to be low quality), reporting no significant differences. Gellatly et al., (2007), using allocation concealment as a proxy for study quality, reported that studies which conceal allocation in self-help trials (blind studies) report lower effect sizes than those who do not adequately conceal allocation.

Only one meta-analytic review of self-help out of the 19 outlined in this chapter has assessed study quality in detail. Farrand and Woodford (2013) used the Cochrane Collaboration’s Risk of Bias Tool (Higgins & Green, 2008) to assess study quality, a detailed and exhaustive measure. The authors reported that lower quality studies (therefore more risk of bias) were associated with larger effect sizes than high quality studies (with a lower risk of bias). The finding that low quality studies lead to larger, inflated and misleading effect sizes is not uncommon. Moher et al. (1998) randomly selected 11 meta-analyses of 127 randomised controlled trials assessing various outcomes including circulatory and digestive diseases, mental health, pregnancy and childbirth. The authors concluded that low quality trials were associated with increased effect sizes (around a 34% increase). The failure to account for study quality when using meta-analysis has important implications. For example, Cuijpers, van Straten, Bohlmeijer, Hollon, & Andersson (2010) conducted a review of 115 randomised controlled trials of psychotherapy for adult depression with the aim of investigating the association between study quality and treatment efficacy. The authors concluded that the effect of psychotherapy on depression has been overestimated in previous meta-analyses due to low study quality. As things stand, few studies have adequately assessed study quality. Consequently, like psychotherapy for depression, it remains open for debate whether the efficacy of self-help has been overestimated.

### Control group

Self-help interventions have been rigorously tested in a variety of experimental designs using a range of control groups. The most common comparison conditions used to investigate self-help efficacy are wait-list and no treatment controls, placebo controls, treatment as usual and contrast treatments such as face-to-face therapist led interventions. Effects sizes of self-help interventions have generally been shown to be the largest when compared against no treatment controls (Gould & Clum, 1993; Marrs, 1995) followed by wait-list control conditions (Farrand & Woodford, 2013; Gould & Clum, 1993; Lewis et al., 2012). From this we can conclude that self-help interventions are better than doing nothing, however the real test comes when self-help interventions are compared to placebo’s, or to current treatment options. For example Gellatly et al. (2007) concluded that the potential of self-help interventions to reduce depressive symptoms is less when compared to usual care or attention placebo conditions as opposed to wait list controls, a finding reported elsewhere (Farrand & Woodford, 2013). Arguably one of the most interesting developments in self-help research has been the comparison of self-help to traditional, therapist led psychotherapy. Cuijpers, Donker, et al. (2010) reported no significant differences between guided self-help interventions and therapist led psychotherapy for both depression and anxiety. Consequently, the control group self-help is compared to makes a significant difference to the effect size reported, with each comparison telling us something important.

### Assessment method

Outcome measures in self-help studies are usually assessed in one of two ways; either self-rated by the participants or externally rated by the researcher(s). The method of assessing outcome variables in self-help studies has been shown to impact on effect sizes of treatment efficacy with varying results. Some meta-analyses of self-help interventions have found that self-reported outcomes result in larger effect sizes when compared to researcher rated outcomes. For example Scogin et al. (1990) found that effect sizes were larger for self-report measures (*d*+ = 0.47) than for observer rated measures (*d*+ = 0.23). Similarly Hirai et al. (2006) reported that self-reported measures produced significantly larger effect sizes than observer ratings when self-help was compared to both controls and therapist directed interventions. Conversely, Den Boer et al. (2004) examined differences in mean effect size of studies using self-report vs. studies using researcher ratings. In contrast to previous reviews, the authors concluded that self-report measures were associated with *lower* effect sizes than researcher rated outcomes (0.69 vs. 1.40 respectively), a finding echoed by Gellatly et al. (2007). Assessment method, therefore, does moderate the efficacy of self-help interventions for depression and anxiety, however the moderating impact is not consistently in one direction.

### Self-help format

Self-help interventions, as outlined earlier, can take a variety of formats. In an early review, Gould and Clum (1993) reported that there were no significant differences between self-help interventions using written materials and those using audio formats (e.g. self-help tapes). With the proliferation of access to technology came a new self-help format; computer and internet delivered interventions. Gellatly et al. (2007) reported no significant differences between written bibliotherapy and computer based interventions. However Lewis et al. (2012) concluded that web-based and multimedia interventions were associated with larger effect sizes than written interventions or books. One of the more robust analyses of self-help format came from Haug et al. (2012) who found that there were significant differences between formats. More specifically they found that when internet/computer based interventions were compared to bibliotherapy, the former was significantly superior (*d*+ = 0.89 vs. *d*+ = 0.60). It would seem then that internet based self-help interventions can offer superior efficacy over more traditional self-help formats such as written materials and audio.

### Diagnosis/symptoms

Many of the meta-analyses outlined in Table 2 either investigated the effects of self-help on depression (Cuijpers, 1997; Gellatly et al., 2007; Gould & Clum, 1993; Gregory et al., 2004) or anxiety alone (Haug et al., 2012; Hirai & Clum, 2006; Lewis et al., 2012), or combined depression and anxiety into one variable (Ahmead & Bower, 2008; Anderson et al., 2005; Bower et al., 2001; Cuijpers, Donker, et al., 2010; Den Boer et al., 2004; Scogin et al., 1990). Six meta-analyses of self-help have however reported the effect of self-help on both depression and anxiety separately with a trend for self-help to reduce anxiety more than depression. For example Marrs (1995) reported that bibliotherapy was associated with larger effect sizes for anxiety symptoms (*d*+ = 0.91) than for depression (*d*+ = 0.57). Similarly, Spek et al. (2007) concluded that when compared with controls, internet-based CBT was more beneficial for anxiety (*d*+ = 0.96) than for depression (*d*+ = 0.27) while Farrand and Woodford (2013) reported a small, non-significant superiority for anxiety when compared to depression. Two meta-analytic reviews of self-help for anxiety and depression have found no significant impact of diagnoses (Cavanagh, Strauss, Forder, & Jones, 2014; Matcham et al., 2014) on treatment efficacy and only one meta-analysis has found self-help to be more beneficial for depression (Menchola et al., 2007). The impact of diagnosis on self-help efficacy is therefore mixed, and conclusions are certainly not definitive.

## What are the advantages of self-help interventions?

Self-help interventions have been shown to be efficacious for common mental health problems such as depression and anxiety. This next section will consider the advantages of using self-help approaches for mental health problems, broadly delineating between the practical and emotional advantages of using self-help interventions.

### Practical advantages

Mohr et al. (2006), and subsequently Mohr et al. (2010), highlighted several practical barriers to psychotherapy for people within the primary care system. These barriers included the cost of psychotherapy, time constraints, transportation difficulties and the care of children and loved ones. Self-help interventions, unlike their face-to-face, time-consuming counterparts are able to alleviate these practical barriers. For example, self-help interventions can be offered remotely, without professional contact in either written or electronic formats via the internet, thus eliminating the need to travel or free up much spare time. Furthermore, the contact provided in the more efficacious guided self-help interventions can be provided without face-to-face contact to great effect via the internet, telephone or other formats. Interventions that require less professional input and incur fewer time constraint’s for the participants are likely to be more cost effective for both patients and health care providers. However, due to a lack of studies assessing the cost effectiveness of self-help (Lewis et al., 2012), any definitive economic conclusions are not possible.

### Emotional advantages

A number of emotional barriers to psychotherapy have also been reported which, theoretically, may not be as prominent with self-help interventions. For example, concerns about what other people would think about their mental health problems are a particular barrier (Mohr et al., 2006; Mohr et al., 2010). The treatment delay often seen at the hands of both public stigma (perceptions of the public that an individual is socially unacceptable) and self-stigma (the perception held by the individual that they are socially unacceptable) is well known and widely researched (Barney, Griffiths, Jorm, & Christensen, 2006; Corrigan, Larson, & Ruesch, 2009; Schomerus & Angermeyer, 2008; Vogel, Wade, & Hackler, 2007). It has been proposed that consumer empowering interventions such as those provided by self-help may help to alleviate concerns about the stigma associated with mental health treatment (Watson, Corrigan, Larsen & Sells, 2007; Corrigan et al. 2009).

## What are the disadvantages of self-help?

### Self-diagnosis

Starting a self-help programme without the involvement of a professional may result in the commencement of an inappropriate self-help intervention. For example, people may start a programme geared towards anxiety only when in reality a more appropriate intervention may deal with anxious experiences *and* depression together. Furthermore some mental health problems may be transitory, a perfectly normal reaction to the stresses of every day life that does not necessarily require intervention (Cuijpers et al., 2007).

### Self-help acceptability

The perceived acceptability of self-help interventions may be one barrier to their successful integration into routine care. People offered self-help interventions might feel that they are inappropriate (Bower & Gilbody, 2005; Scogin, Hanson, & Welsh, 2003), especially for more severe mental health problems (Landreville, Landry, Baillargeon, Guerette, & Matteau, 2001). Evidence on the perception of self-help interventions is limited. However, Hanson, Webb, Sheeran and Turpin (2015) found that guided self-help for depression was deemed to be as acceptable as face-to-face treatments such as psychotherapy, although pure forms of self-help were less preferred. Practitioners may also have concerns regarding recommending self-help, e.g., that self-help interventions cannot address the complex and wide-ranging presentations seen in mental health (Pratt, Halliday, & Maxwell, 2009).

## Conclusion

Self-hep interventions are an effective, potentially economical and widely accessible tool for treating both the symptoms of common mental health problems as well as associated outcomes such as quality of life. Self-help has the potential reduce the burden on therapist waiting times, ease financial concerns around mental health care provision and provide a viable treatment option for people within a stepped system of care. There are however unanswered questions; particularly can self-help interventions be used to treat more serious mental health problems? The next chapter aims to review the extant literature on self-help interventions for psychosis using meta-analysis.

# Self-help interventions for psychosis: A meta-analysis

## Introduction

In Chapter 2 we saw that self-help interventions have largely been used for common mental health issues such as depression and anxiety rather than for the symptoms of psychosis. However, their application to psychosis has been steadily growing in recent years. As Chapter 1 discusses, psychosis is a highly variable experience. Typically it involves a loss of contact with reality through hallucinations and/or delusions (strongly held beliefs, maintained despite a lack of evidence, Bentall et al., 2001) and is often concomitant with negative symptoms (e.g., withdrawal or lack of thoughts, feelings, and behaviours that are usually present, Sommers, 1985) and reduced quality of life and functioning (Fusar-Poli et al., 2015). These experiences are among the clinical hallmarks of many psychiatric diagnoses including schizophrenia, schizoaffective disorder, and bipolar disorder. However they are also experienced, to a milder extent, by a substantial proportion of the general population (Hanssen et al., 2005; van Os et al., 2000; van Os et al., 2009). Despite the apparent efficacy of self-help interventions for depression and anxiety (for reviews, see Cuijpers, Donker, et al., 2010; Gellatly et al., 2007; Haug et al., 2012; van't Hof et al., 2009), empirical research into the application of self-help to psychosis, although growing, lags behind (Lewis et al., 2003). Consequently the extent to which self-help interventions influence symptoms and outcomes associated with psychosis is unclear.

It has; however, become evident that people experiencing psychosis can influence their symptoms and become agents of their own recovery (Kingdon, Murray, & Doyle, 2004). Rather than viewing psychosis as having inescapably poor clinical and functional outcomes, contemporary views consider the course of these disorders to be more fluid in nature and amenable to change (McGorry, Killackey, & Yung, 2008). This shift in attitude is reflected in a growing evidence base for the use of CBT for psychosis (e.g., Burns et al., 2014; Gould et al., 2001; Hutton & Taylor, 2014; Pilling et al., 2002; Rector & Beck, 2001; van der Gaag et al., 2014; Wykes, Steel, Everitt, & Tarrier, 2008; Zimmermann, Favrod, Trieu, & Pomini, 2005). CBT emphasizes homework – designed to facilitate the application of what has been learnt in therapeutic sessions to the real world (Haarhoff & Kazantzis, 2007; Kazantzis, Pachana, & Secker, 2003). This feature led Lewis et al. (2003) to argue that “such therapies are therefore essentially self-help in nature” (p. 9). Consequently, it may not be unreasonable to assert that self-help approaches may be useful for psychosis.

Further support for the use of self-help interventions for psychosis is provided by evidence which suggests that informal, self-initiated strategies are already naturally used by those experiencing psychosis. For example, Farhall, Greenwood, and Jackson (2007) reviewed nine studies investigating the use of ‘natural coping’ strategies directed at psychotic experiences (natural coping strategies were defined as “actions taken to ameliorate the symptom or to regulate emotion that are assumed to have been chosen and implemented without assistance from professionals” Farhall et al., 2007, p. 477). Farhall et al. reported that at least 70% of the people with psychosis that they studied could identify a coping behaviour that they used to ameliorate psychotic symptoms. It seems that self-initiated strategies are already used by those experiencing psychosis, thereby providing a rationale for more formalized self-help packages.

### Current self-help interventions for psychosis

As with other mental health difficulties, self-help approaches may reduce the experiences and symptoms of psychosis. For example, self-help interventions could be used to address the frequency of symptoms, the extent to which they can be controlled, and/or the distress associated with symptoms such as hallucinations and delusions. Alternatively, or in addition, self-help interventions can target difficulties associated with the experience of psychosis, such as anxiety, self-esteem, low mood, and poor social functioning. Self-help interventions for psychosis can take a number of forms including those based on psychoeducation, behavioural approaches, and peer support. Psychoeducation is one of the more common approaches. For example, Smith et al. (2011) developed an Internet-based intervention for those with bipolar disorder. The intervention involved participants being given information about the causes of bipolar disorder, medication, lifestyle changes, the role of early intervention, and information regarding the various psychological approaches to bipolar disorder. The authors reported no significant differences in primary outcome measures (quality of life) or secondary outcomes (symptom reduction).

Other interventions augment psychoeducation with approaches such as peer support and CBT. For example, Alvarez-Jimenez et al. (2013) supplemented Internet based psychoeducation with online peer-to-peer social networking and elements of computerized CBT. Peer-to-peer social networking typically involved those with shared experiences interacting via an online platform, providing each other with mutual support whereas computerized CBT delivered online cognitive strategies to help identify unhelpful thinking patterns (e.g., ruminative thoughts). The authors reported significant reductions in depression, as well as increases in perceived social connectedness and empowerment.

Cognitive behavioural therapy seems to be less frequently used as a basis for developing self-help for psychosis when compared to its use in self-help for depression and anxiety (e.g., van't Hof et al., 2009). As noted above; however, CBT is still used as the basis of self-help interventions for psychosis, both in combination with other techniques (e.g., psychoeducation) and as a standalone basis. In the latter regard, Gottleib, Romeo, Penn, Mueser, and Chiko (2013) investigated the efficacy of an online, computerized CBT program for auditory hallucinations in those with a psychotic disorder receiving outpatient mental health services. Gottleib et al. (2013) reported statistically significant reductions from baseline to post-treatment in several measures of auditory hallucinations as well as high levels of engagement with the intervention. Granholm, Ben-Zeev, Link, Bradshaw, and Holden (2012) used personalized SMS text messaging to deliver elements of CBT aimed at medication adherence, socialization, and auditory hallucinations, and reported increases in medication adherence and reductions in hallucinations. There are also behavioural interventions that are not necessarily based on the principles of CBT. For example, Bloch et al. (2010) invited participants to use audio relaxation techniques and assessed their impact on symptoms and quality of life, reporting reductions in total symptom scores and levels of depression.

Peer-support groups involve those with shared experiences of a particular set of symptoms and/or diagnoses interacting with one another in order to provide mutual support. For example, Castelein et al. (2008) investigated the efficacy of guided peer support groups in a multi-centre trial for those with a diagnosis of schizophrenia or a related psychotic disorder. The intervention involved groups of up to 10 participants meeting biweekly for 8 months with the topics for discussion left to the participants to decide upon (discussions were minimally facilitated by a nurse). Castelein et al. reported significant improvements in the social networks of participants; however did not find any improvements in other domains such as quality of life. Peer-support groups are not only delivered face-to-face – online peer-support for psychosis has also been developed. For example, Kaplan, Salzer, Solomon, Brusilovskiy, and Cousounis (2011) developed a randomised controlled trial of Internet delivered peer support for those with schizophrenia spectrum diagnoses and affective disorders. However, Kaplan et al. (2011) reported no significant differences between those receiving online peer support and those allocated to a wait-list control condition on outcomes such as quality of life, depression and anxiety.

Despite studies testing the efficacy of a range of different self-help approaches to the treatment of psychosis, the provision of self-help for psychosis is in its infancy and, to date, there has been no systematic review of the evidence or attempt to quantify effect sizes. As a consequence, it is difficult to know whether to continue to develop self-help approaches for psychosis or whether resources might be more profitably directed elsewhere. The present review aims to systematically evaluate the effect of self-help interventions for psychosis. Specifically, meta-analysis is used to quantitatively synthesize studies that investigate the effect of self-help interventions on psychotic experiences, as well as other associated outcomes (such as wellbeing, quality of life and distress).

### What factors might influence the impact of self-help on psychosis?

The impact of self-help on the symptoms and associated outcomes of psychosis may be affected by the nature of the intervention, the design of the study, and features of the focal sample. Below, we outline factors that could influence the impact of self-help on psychosis, within each of these broad categories.

#### Nature of the intervention

Contact with a therapist, researcher, or peers may influence the effect of self-help interventions. Self-help in its purest form requires no assistance. However, self-help can be supported and there is evidence that guided self-help programs are more effective than unguided (or ‘pure’) self-help. For example, Gellatly et al. (2007) reviewed studies investigating the effects of self-help and guided self-help on depression, and found that the effect size almost doubled from *d*+ = 0.43 to *d*+ = 0.80 when only studies investigating the effects of guided self-help were included. The extent of contact and experimenter imposed structure in self-help interventions varies greatly (Newman, Erickson, Przeworski, & Dzus, 2003) and, as such, it will be important to investigate the impact of contact on the efficacy of self-help interventions for psychosis. We predict that, in line with previous research, interventions including contact will be associated with larger effect sizes than interventions with no contact.

Self-help techniques range from the relatively simple to the more complex. Some interventions comprise multiple self-help techniques designed to be used together in order to form a ‘tool-kit’ that can be implemented when needed. For example, Buccheri et al. (2004) reported the effects of a 10-week program incorporating psychoeducation, self-monitoring, relaxation, distraction, and thought-stopping (see also Buccheri, Trygstad, & Dowling, 2007; Kanungpairn, Sitthimongkol, Wattanapailin, & Klainin, 2007). Other interventions employ only one self-help technique (such as the intervention developed by Bloch et al., 2010, which used only audio relaxation). The present review will compare the effects of interventions using a single self-help technique with those that include multiple self-help techniques. On the basis of an exploratory study investigating self-help techniques used by those experiencing psychosis, Carter, Mackinnon and Copolov (1996) advocate “an approach that introduces patients to a range of strategies” (p. 164). Our prediction, therefore, is that interventions with multiple components will be more effective than simpler interventions.

The theoretical basis of self-help interventions for psychosis tends to vary. However, three distinct approaches in the form of psychoeducation, behavioural interventions (including those based on the principles of CBT) and peer support self-help groups are evident. The present review will investigate whether the theoretical basis of the intervention influences effect sizes. Previous reviews have found that the use of behavioural self-help interventions are more effective than interventions based on psychoeducation (Gellatly et al., 2007). Therefore, it is predicted that behavioural interventions will have larger effects on the symptoms of psychosis and associated outcomes than will psychoeducation and peer support self-help groups.

The mode of delivery is another factor that could potentially influence effect sizes. Typically, interventions are delivered either face-to-face or remotely via, for example, an online platform. The use of assistive technology in psychological interventions (such as the use of smartphones, tablets, laptops, and online resources) has brought about a technological revolution in psychotherapy delivery, leading Newman, Szkodny, Llere, and Przeworkski (2011) to ask whether face-to-face contact is even necessary for therapeutic efficacy. The current review will attempt to provide an answer to this question in relation to self-help interventions for psychosis by comparing the effect of self-help interventions delivered face-to-face versus remotely.

#### Study design

A number of features related to the design of the focal studies could influence effect sizes. In an effort to provide a comprehensive review, we included studies with both repeated and independent measures designs. In other words, studies that allocated participants to receive or not to receive a self-help intervention, as well as studies that compare symptoms and outcomes before and after exposure to an intervention. Repeated measures designs can potentially inflate effect sizes due to factors other than the intervention (e.g., natural improvements over time) influencing the apparent effects. Consequently, it is possible that effect sizes may differ between study designs.

For self-help to be a viable option for psychosis, treatment effects must be maintained. van’t Hof et al. (2009) reviewed 13 meta-analyses investigating the effects of self-help for different mental health problems (although, unfortunately, not psychosis). Only three reviews investigated whether the effect of self-help interventions on outcomes changed over time. These reviews typically reported a small-to-moderate erosion of effect sizes as time progressed (Den Boer et al., 2004; Hirai & Clum, 2006; Marrs, 1995). Consequently, the current review will assess whether the length of the follow-up period (i.e., the time interval between the end of the intervention and the measure of outcomes) influences the efficacy of the interventions. In line with previous reviews in other domains, we expected that longer-follow-up points would be associated with smaller effect sizes.

Given that research into the effects of self-help interventions is in its infancy, it is possible that interventions are improving over time. Therefore, publication date may influence effect sizes to the extent that larger effects are observed in more recent interventions. Alternatively, effect sizes may reduce with the accumulation of more data. For example, Trikalinos et al. (2004) found that the magnitude of effect sizes in meta-analyses investigating therapeutic and preventative interventions in mental health reduce over time as methods were refined and sources of biases were identified and controlled for. Either way, it seems important to investigate the possibility that publication date will influence the effect of self-help interventions on psychosis.

Finally,the scientific rigor and quality of studies can vary (Conn & Rantz, 2003). This can present the researcher with a problem; which studies are of sufficient quality to provide a meaningful contribution to a meta-analysis? The first step is to judge the methodological quality of the primary studies (for reviews, see Deeks et al., 2003; Moher et al., 1995; West et al., 2002). Having assessed the quality of the primary studies, there are two ways to solve the study quality issue; one is to include only the highest quality studies, the second is to include all of the studies and to investigate the impact of study quality on effect sizes using moderation analysis (Cooper, 1998). Given that the evidence base for self-help interventions for psychosis is in its infancy, we wanted to adopt an inclusive approach and so adopted the latter procedure and assessed the effect of study quality on outcomes.

#### Sample characteristics

Studies examining the effects of self-help on experiences and outcomes associated with psychosis recruit participants with a range of diagnoses, including psychosis spectrum diagnoses and affective diagnoses such as bipolar disorder. Because self-help interventions may have different effects on these two populations, it is important to investigate the effect of the diagnosis of participants included in the primary studies.

### The Present Review

The present review sought to investigate the effect of self-help interventions on symptoms and associated outcomes among people experiencing psychosis. Although self-help has proved effective for other mental health problems (e.g., Cuijpers, Donker, et al., 2010; Gellatly et al., 2007; Haug et al., 2012; van't Hof et al., 2009) and studies have started to investigate the efficacy of self-help for psychosis (Alvarez-Jimenez et al., 2013; Casstevens, Cohen, Newman, & Dumaine, 2006; Gottlieb et al., 2013; Smith et al., 2011), to date, there has been no systematic review of such studies and thus little information as to whether a self-help approach to psychosis is beneficial and what factors influence the efficacy of such interventions. We therefore sought to identify relevant studies and compute the sample-weighted average effect of self-help interventions on various outcomes. We aimed to assess the impact of interventions on both symptoms and associated outcomes because contemporary approaches include well-being and functional indicators alongside symptomatic recovery (Remington, Foussias, & Agid, 2010). The experience of psychosis is more than symptoms alone (Birchwood & Trower, 2006) and outcomes associated with psychosis such as emotional distress play an important part in the pathway to psychosis (Hanssen et al., 2003) and relapse (Owens, Miller, Lawrie, & Johnstone, 2005) and should, therefore, be included when assessing the efficacy of interventions. We also coded the nature of the intervention, along with features of the study design, and sample that could influence effect sizes.

## Method

### Literature Search Strategies

The sample of studies was generated via a computerized search of social scientific databases (Web of Science, Medline, BIOSIS Previews, BIOSIS Citation Index, Current Contents Connect, and Journal Citation Reports) in February 2014. The terms used to identify self-help interventions were *self-help, self-monitoring, self-instruction, self-administered, telehealth, brief intervention, web-based, internet, online, low-intensity, computer based, bibliotherapy, psychoeducation, distraction, relaxation, support group* and *minimal contact*. These terms were combined with terms related to psychosis experience; *psychosis, psychoses, psychotic, schiz\*, paranoia, hallucinations, delusions, negative symptoms*, *positive symptoms, bipolar, manic depress\** and *mania*. Key terms were searched for in the title, abstract and keywords of potential papers. In addition to the search for published papers, a comprehensive attempt to search for unpublished literature was made by searching online databases including White Rose Online, The National Research Register, The Cochrane Library, the Mimas Institutional Repository Search and ProQuest. The authors of each study that was deemed eligible for inclusion were also contacted and asked for any unpublished research evaluating the effects of self-help interventions for psychosis. This process identified 9,970 potential papers, with a further 742 papers identified by searching the reference lists of included studies (ancestry approach; Johnson, 1993).

### Inclusion and Exclusion Criteria

There were five criteria that needed to be met in order for a study to be eligible for inclusion. First, the study needed to evaluate the effect of a self-help intervention, defined in terms of Bower, Richards and Lovell’s (2001) definition. Namely, that the intervention was “designed to be conducted predominantly independently of professional contact” (p. 839). We included a variety of self-help interventions including both pure and guided interventions, along with peer-support self-help groups. Second, studies needed to recruit a sample of participants who were experiencing symptoms associated with psychosis. Third, studies needed to measure symptoms associated with psychosis and/or outcomes associated with the experience of psychosis. For example, we included studies that included a general measure of symptomology such as that provided by the Young Mania Rating Scale (YMRS: Young, Biggs, Ziegler, & Meyer, 1978) or the Positive and Negative Syndrome Scale (PANSS: Kay et al., 1987). We also included studies that reported the effect of interventions on specific symptom domains[[1]](#footnote-1) such as the Scale for the Assessment of Negative Symptoms (Andreasen, 1984a) and the Scale for the Assessment of Positive Symptoms (Andreasen, 1984b). Studies were also eligible for inclusion if they reported the effect of a self-help intervention on outcomes associated with psychosis experience such as quality of life, distress, and mood (e.g., the Beck Depression Inventory, Beck, Steer, & Brown, 1996). The fourth inclusion criterion was that studies needed to report sufficient data for us to be able compute the effect of the intervention. Where sufficient data was not reported, we contacted the authors in order to request the necessary data. Finally, we required that studies be written in English, or a language that could be translated using available translation resources.

### Study Selection and Data Extraction

We followed PRISMA guidelines for the selection of studies for meta-analysis (Moher, Liberati, Tetzlaff, & Altman, 2009). Titles and abstracts were first judged for eligibility, with clearly ineligible studies excluded. Following this, full text articles were screened for inclusion and either included, or excluded with reasons. Figure 2 shows the flow of articles through the review.

Figure 2

*Flow of Studies Through the Review*



After duplicates were removed, 5,612 articles remained which were then screened by looking at the title and abstract of each article. This initial screening resulted in the exclusion of 5,416 articles, leaving 196 potential articles that were screened in detail by looking at the full text. Of these 196 articles, 82 (42%) were excluded because the intervention did not meet Bower et als. (2001) definition of a self-help intervention. For example, while Hauser et al. (2009) used a psychoeducation intervention for those at risk of being diagnosed with schizophrenia, there was no indication that the intervention was primarily delivered independently of professional contact. An additional 61 articles (31%) were excluded on the basis that the author(s) did not report a measure of symptom severity or associated outcomes. For example, Steinwachs et al. (2011) reported the use of a web-based program to empower those with a diagnosis of schizophrenia to discuss the quality of their care with mental health providers. However, Steinwachs et al. were interested in the effects of the intervention on measures such as communication with care providers rather than on the symptoms of psychosis or outcomes associated with psychosis experience such as quality of life and distress.

An additional 21 articles (11%) were excluded as the focus of these papers was not on the experience of psychosis symptoms. For example, Lobban et al. (2011) investigated the use of an education and coping toolkit for the relatives of those experiencing psychosis. Therefore, as the focus of this intervention was on the relatives of those experiencing psychotic symptoms, this paper was excluded. A further 8 articles (4%) were excluded because they did not report sufficient data for us to be able compute an effect size and contact with the authors did not produce this information (e.g., Stevens & Sin, 2005). In total 24 studies (12%) comprising a total of 25 interventions investigating the effect of self-help interventions for psychosis were included in the present review. Table 3 provides a list of these studies, along with their associated characteristics.

Table 3

*Characteristics of the Primary Studies*

**Study Theoretical basis Follow-up Outcome *Ne* *Nc* Effect size (*d*)**

Alvarez-Jimenez et al. (2013) Psychoeducation 4 weeks BPRS total 20 - 0.04

 CDRS 20 - 0.22

Bloch et al. (2010) Behavioural Post-intervention BPRS total 24 - 0.50\*

 PANSS pos 24 - 0.77\*\*

 PANSS neg 24 - 0.32

 PANSS total 24 - 0.48\*

 SQLS 24 - 0.61

 Q-LES-Q 24 - 0.53

Buccheri et al. (2004) Behavioural 52 weeks CAHQ frequency 72 - 0.81\*

 CAHQ self-control 72 - 0.88\*\*

 CAHQ clarity 72 - 1.20\*\*

 CAHQ distractibility 72 - 0.76\*

 36 weeks POMS 72 - 0.51\*

Buccheri et al. (2007) Behavioural 52 weeks AH to harm self 46 - 1.25\*\*

 AH to harm others 46 - 0.30\*

Casstevens et al. (2006) Behavioural Post-intervention BPRS total 16 11 -0.31

 BPRS anx/dep 16 11 0.28

Castelein et al. (2008) Peer support 32 weeks WHO QoL 52 45 0.08

Cunningham-Owens et al. (2001) Psychoeducation 52 weeks PANSS total 23 23 0.30

 MADRS 43 39 0.02

Depp et al. (2010) Psychoeducation Post-intervention YMRS 10 - 0.15

 MADRS 10 - 0.41\*\*

Eisen et al. (2012) Peer support 12 weeks BASIS-24 psychosis 74 84 0.09

 BASIS-24 depression 74 84 0.10

Gottlieb et al. (2013) Behavioural Post-intervention PSYRATS AH 17 - 0.29

 BPRS total 17 - 0.49

 BDI-II 17 - 0.34

Granholm et al. (2011) Behavioural Post-intervention PANSS total 41 - -0.04

 PANSS pos 41 - 0.01

 PANSS neg 41 - 0.03

 BDI-II 41 - 0.09

Han et al. (2008) Behavioural Post-intervention SAPS 32 49 0.26

 SANS 32 49 0.35

Hegde et al. (2012) Behavioural 16 weeks PANSS gen 12 11 0.36

 PANSS pos 12 11 -0.63

 PANSS neg 12 11 1.05\*

Hustig et al. (1990) Behavioural Post-intervention AH frequency 9 - 0.13

 AH loudness 9 - -0.20

 AH clarity 9 - 0.22

 AH distress 9 - 0.08

 AH intrusiveness 9 - -0.17

 AH thought clarity 9 - -0.33

 AH anxiety 9 - 0.00

 AH mood 9 - 0.13

 AH hostility 9 - -0.20

Jones et al. (2001) Psychoeducation 12 weeks BPRS total 34 - 0.03

Kanungpairn et al. (2007) Behavioural Post-intervention CSAH 9 9 1.72\*\*

Kaplan et al. (2011) Peer support Post-intervention QoL 200 100 0.08

 HSCL-25 200 100 0.15

Meddings et al. (2004) Peer support Post-intervention HHTVRS 17 - 0.33

Patra et al. (2011) Psychoeducation 12 weeks PANSS gen 6 14 0.58

 PANSS pos 6 14 0.36

 PANSS neg 6 14 0.82\*\*

 PANSS total 6 14 0.48

 QoL brief 6 14 0.34

Pitkanen et al. (2012) Psychoeducation 52 weeks Q-LES-Q 86 98 0.00

Proudfoot et al. (2012)a Psychoeducation & support 24 weeks Life satisfaction 134 67 0.01

 Depression 134 67 0.13

 Anxiety 134 67 0.04

Proudfoot et al. (2012)a Psychoeducation 24 weeks Life satisfaction 139 67 0.09

 Depression 139 67 0.03

 Anxiety 139 67 0.03

Rotondi et al. (2005) Psychoeducation 12 weeks Perceived stress 16 14 0.95\*

Rotondi et al. (2010) Psychoeducation 52 weeks SAPS 16 15 0.42

Smith et al. (2011) Psychoeducation Post-intervention QoL 17 20 0.04

 YMRS 17 20 0.24

 MADRS 17 20 0.17

*Note*: a The two interventions evaluated by Proudfoot et al. (2012) were treated separately in the analysis so the sample size for the control group was halved accordingly. *N*c = number of participants in control group, *N*e = number of participants in experimental group, AH = auditory hallucinations, BASIS-24 = Behaviour and Symptom Identification Scale (Eisen, Normand, Belanger, Spiro, & Esch, 2004), BDI-II = Beck Depression Inventory (A. T. Beck et al., 1996), BPRS = Brief Psychiatric Ratings Scale (Overall & Gorham, 1962), CAHQ = Characteristics of Auditory Hallucinations Questionnaire (Trygstad et al., 2002), CBT = cognitive behaviour therapy, CDRS = Calgary Depression Scale for Schizophrenia {Addington, 1993, ASSESSING DEPRESSION IN SCHIZOPHRENIA - THE CALGARY DEPRESSION SCALE}, CSAH = Characteristics and Severity of Auditory Hallucination Scale (Trygstad et al., 2002), HHTVRS = Hustig & Hafner Topography of Voices Rating Scale (Hustig & Hafner, 1990), HSCL-25 = Hopkins Symptom Check List (Derogatis, Lipman, Rickels, Uhlenhut, & Covi, 1974), MADRS = Montgomery-Asberg Depression Rating Scale (Montgomery & Asberg, 1979), PANSS = Positive and Negative Syndrome Scale (Kay et al., 1987), POMS = Profile of Mood States (McNair, Lorr, & Droppleman, 1992), PSYRATS = Psychotic Symptom Rating Scales (Haddock, McCarron, Tarrier, & Faragher, 1999), Q-LES-Q = Quality of Life Enjoyment and Satisfaction Questionnaire (Endicott, Nee, Harrison, & Blumenthal, 1993), QoL = quality of life, SANS = Scale for the Assessment of Negative Symptoms (Andreasen, 1984a), SAPS = Scale for the Assessment of Positive Symptoms (Andreasen, 1984b), SQLS = Schizophrenia Quality of Life Questionnaire (Wilkinson et al., 2000), YMRS = Young Mania Rating Scale (Young et al., 1978).

\**p* < .05, \*\**p* < 0.01, \*\*\* *p* < .001.

### Data extraction

#### Coding the nature of the intervention

The features and characteristics of the self-help interventions were independently coded by the first and third authors to investigate whether they moderated the effect of interventions on symptoms and outcomes. We used a Pearson correlation coefficient to assess agreement levels of continuous variables (e.g. study quality) and Cohens Kappa coefficient (*k*) to assess the level of agreement of categorical variables (e.g. contact was either pure or guided self-help). Any disagreements were resolved jointly by discussion. Agreement was uniformly high across all extracted variables (91% agreement rate). More specifically, inter-rater agreement for study quality was very high (*r* = 0.79, *p* < 0.001) along with Kappa coefficients for diagnosis (*k* = 0.82, *p* < 0.001), study design (*k* = 1.00, *p* < 0.001), contact (*k* = 0.76, *p* < 0.001), mode of delivery (*k* = 0.92, *p* < 0.001), intervention complexity (*k* = 0.64, *p* < 0.001) and the theoretical basis of the intervention (*k* = 0.87, *p* < 0.001).

Interventions were classed as *guided* self-help wherever a therapist, researcher, or peer was in contact with participants. Contact was defined as that “aimed at providing support and, if necessary, added explanation for working through the standardized psychological treatment.” (Cuijpers & Schuurmans, 2007, p. 284). Contact could be provided through personal contact, by telephone, e-mail or any other available means of communication. Interventions where there was no contact were classed as *pure* self-help.

The theoretical basis of each intervention was classed as either psychoeducational, behavioural, or peer-support. Behavioural interventions were classed as those which attempted to change or adapt behaviour (e.g., interventions based on the principles of CBT) while interventions that only provided information (e.g., regarding diagnosis, medication etc.) were classed as psychoeducation. Interventions providing assistance and support from peers who also had a shared experience of psychosis were classed as involving peer-support. Interventions were divided into those that used a single self-help technique versus those that used multiple techniques. Finally, mode of delivery was coded as either face-to-face (e.g., support groups) or remote (e.g., online CBT).

#### Coding study design

The design of each study was categorized as either repeated measures (i.e., measures of symptoms or outcomes were taken from the same participants before and after an intervention) or independent groups (i.e., randomised controlled trials, quasi-experimental designs etc.). The length of follow-up was coded in weeks (e.g., a 12 month follow up was coded as 52 weeks). Finally, the quality of primary studies was assessed using Downs and Black’s (1998) Quality Index (QI), which is a 27-item checklist assessing study quality in multiple domains such as reporting quality, external and internal validity, sources of bias and confounding. Downs and Black’s QI was chosen in part due to its popularity (it has been cited over 2,000 times), meaning that the ratings of study quality generated here can be compared to other studies using the QI. It was also rated by Deeks et al. (2003) as one of the 14 best tools for evaluating bias in non-randomised intervention studies.

#### Coding Sample Characteristics

The diagnosis of participants recruited in each of the primary studies was coded into three levels; psychosis, bipolar disorder, and mixed diagnoses. Decisions on which category of diagnosis participants belonged too were taken based on information reported by the study authors (typically based on DSM or ICD-10 criteria).

#### Meta-Analytic Strategy

Effect sizes (Cohen’s *d*) were calculated for each study. Where possible, *d* was calculated using the means and standard deviations reported in each primary study. However, where this data was not reported and contact with the author(s) failed to result in the relevant means and standard deviations, test statistics (e.g., *F* ratios, exact *p* values or *t*-values) were converted to an effect size *r* using Schwarzer’s META program (Schwarzer, 1989). Effect size *r* was then converted to effect size *d*. Effect sizes were calculated separately for the overall effects of self-help interventions on psychotic symptomology, as well as for the effects on positive symptoms, negative symptoms and outcomes associated with the experience of psychosis. Where studies reported multiple relevant measures (e.g., Hustig et al., 1990, included measures of various aspects of hallucinations) effect sizes were computed separately for each measure and averaged prior to inclusion in the main analyses. Effect sizes were calculated using data from the furthest follow-up point available.

Because repeated measures designs can have a power advantage over independent group designs (Dunlap, Cortina, Vaslow, & Burke, 1996), effect sizes computed from independent groups designs and repeated measures designs were converted into a common metric before analysis following the procedures suggested by Morris and DeShon (2002). Where studies compared two intervention groups to a control group (e.g., Proudfoot et al., 2012, compared two types of peer support self-help groups with usual care), both comparisons were included separately. However, so as not to violate the assumption of independence, the sample size of the control condition (against which both intervention groups were compared) was halved to ensure that participants were not counted twice (Borenstein, Hedges, Higgins, & Rothstein, 2009).

Sample-weighted average effect sizes (*d*+) were based on a random effects model as studies were likely to be “different from one another in ways too complex to capture by a few simple study characteristics” (Cooper, 1986, p. 526). Following Cohen’s (1992) recommendations, *d* = 0.20 was taken to represent a ‘small’ effect size, *d* = 0.50 a ‘medium’ effect size, and *d* = 0.80 a ‘large’ effect size. We use these qualitative indexes to interpret the findings. Variability in effect sizes was determined using the homogeneity statistic Q and Orwin’s (1983) formula was used to determine the fail-safe *N* (the number of studies producing a trivial effect that would be needed in order to reduce the overall effect of self-help interventions to a trivial effect).[[2]](#footnote-2)

## Results

Table 4 shows the sample weighted average effect of self-help interventions on overall symptoms, positive symptoms, negative symptoms, and outcomes associated with the experience of psychosis. Below, we report the effect of interventions on each outcome, followed by the effects of moderation analyses examining the factors that influence effect sizes.

Table 4

*Sample-Weighted Average Effect of Self-Help Interventions on Symptoms of Psychosis and Associated Outcomes*

Condition *k N Q* 95% CI Fail-safe *N d*+

Overall 19 727 21.32 .17 to.50 43 .33

Positive symptoms 12 195 18.50 .13 to .72 38 .42

Negative symptoms 5 188 3.66 .07 to .66 13 .37

Associated outcomes 18 1327 9.83 .02 to .24 5 .13

### The Effects of Self-Help Interventions on Overall Symptoms

Figure 3 shows the distribution of effect sizes associated with self-help interventions on the overall symptoms of psychosis. The sample weighted average effect of self-help interventions on symptoms was *d*+ = .33, with a 95% confidence interval from .17 to .48, derived from 19 studies and a total sample size of *N* = 727. This means that self-help interventions had, on average, a statistically significant, small-to-medium-sized effect across the symptoms of psychosis and associated outcomes according to Cohen’s (1992) criteria. The homogeneity statistic was not significant, *Q*(18) = 21.32, *p* =.26, indicating that the effect sizes derived from the primary studies were homogenous. Orwin’s (1983) formula was used to determine the fail-safe *N*. Results suggested that an additional 43 studies with trivial effect sizes (*d* = .10) would be needed to overturn the conclusion that self-help interventions have a beneficial effect on overall symptoms.

Figure 3

*The Effects of Self-Help Interventions on Overall Symptoms*



*Note*: Effect sizes to the right of the zero line favour self-help, whereas effect sizes to the left favour the comparison condition. The dashed vertical line represents the sample weighted average effect size (*d*+)

### The Effects of Self-Help Interventions on Positive Symptoms

We also investigated the effects of self-help interventions on positive symptoms separately. Figure 4 shows the distribution of effect sizes across the primary studies. The sample-weighted average effect of self-help interventions on positive symptoms was *d+ =* .42 with a 95% confidence interval from .13 to .72 derived from 12 studies with a total sample size of *N* = 395. Again, the homogeneity statistic was not significant, *Q*(11) = 18.43, *p* =.07, indicating that the effect sizes were homogenous. The fail-safe *N* was 38, indicating that the effect of self-help interventions on positive symptoms was robust.

Figure 4

*The Effects of Self-Help Interventions on Positive Symptoms*



*Note*: Effect sizes to the right of the zero line favour self-help, whereas effect sizes to the left favour the comparison condition. The dashed vertical line represents the sample weighted average effect size (*d*+)

### The Effects of Self-Help Interventions on Negative Symptoms

Figure 5 shows the effects of self-help interventions on negative symptoms. The sample-weighted average effect was *d+ =* .37 with a 95% confidence interval from .07 to .66 derived from 5 studies with a total sample size of *N* = 188. The homogeneity statistic was not significant, *Q*(4) = 3.66, *p* =.45, indicating that the effect sizes were homogenous. However, due to the relatively small number of studies investigating the effects of self-help interventions on negative symptoms, Orwin’s fail-safe *N* indicated that only 13 studies reporting an effect size of .10 or less would be needed to overturn the conclusion that self-help interventions have a non-trivial effect on negative symptoms.

Figure 5

*The Effects of Self-Help Interventions on Negative Symptoms*



*Note*: Effect sizes to the right of the zero line favour self-help, whereas effect sizes to the left favour the comparison condition. The dashed vertical line represents the sample weighted average effect size (*d*+)

### The Effects of Self-Help Interventions on Associated Outcomes

Finally, we examined the effects of self-help interventions on outcomes associated with psychosis. Figure 6 shows the distribution of effect sizes across the primary studies. The sample-weighted average effect was *d+ =* .13 with a 95% confidence interval from .02 to .24 derived from 18 studies with a total sample size of *N* = 1,327. There was no significant variation in effect sizes, *Q*(17) = 9.83, *p* =.91*,* indicating that the effect sizes were homogenous. However, Orwin’s fail-safe *N* was just 5, indicating that the positive effect of self-help interventions on associated outcomes is relatively fragile.

Figure 6

*The Effects of Self-Help Interventions on Associated Outcomes*



*Note*: Effect sizes to the right of the zero line favour self-help, whereas effect sizes to the left favour the comparison condition. The dashed vertical line represents the sample weighted average effect size (*d*+)

### Moderators of the Effects of Self-Help Interventions for Psychosis

In order to investigate whether factors pertaining to the nature of the intervention, study design, and sample influenced effect sizes we conducted moderation analyses. For categorical variables (e.g., study design was either repeated measures or independent group), the sample-weighted average effect size (*d+*) and associated statistics were calculated separately for each level of the moderator and homogeneity *Q* was used to identify which effect sizes differed significantly (providing that there were at least 3 studies representing each level of the moderator). The effect of continuous variables (e.g., study quality) on effect sizes was analysed using meta-regression.

#### *Overall symptoms of* psychosis

##### Nature of the intervention

Guided self-help interventions did not have significantly different effects on the overall symptoms of psychosis than pure self-help interventions (*d+* = .43 vs. *d+* = .27), *Q*(1) = 1.18, *p* = .28 (see Table 5). In terms of the theoretical basis of self-help interventions it was only possible to compare psychoeducation versus behavioural interventions as only two studies investigated the effect of support groups. Self-help interventions using psychoeducation (*d*+ = .24) and those using behavioural approaches (*d*+ = .48), did not have significantly different impacts on effect sizes, *Q*(1) = 1.79, *p* = .18. Interventions that incorporated multiple self-help techniques were associated with significantly larger effect sizes (*d+* = .80) than interventions using a single technique (*d+* = .16), *Q*(1) = 11.64, *p* < .001. Finally, interventions delivered face-to-face did not have significantly larger effects than interventions delivered remotely (*d*+ = .48 vs. .25 respectively), *Q*(1) = 2.18, *p =* .14.

##### Study design

Effect sizes did not differ between studies using repeated measures designs (*d*+ = .42) and independent group designs *(d*+ = .35), *Q*(1) = .22, *p* = 0.64. The methodological quality of the primary studies did not influence the effect of the interventions on overall symptoms, *β* = -.33, *t* = -1.46, *p* = 0.16, neither did the length of follow-up, *β* = .44, *t* = 2.03, *p* =.06, or publication date, *β* = -.19, *t* = -.80, *p* = .44 (see Table 6).

##### Sample characteristics

There were no significant differences in symptoms between studies recruiting participants with a diagnosis of psychosis (only) *(d*+ = .39) and studies recruiting participants with mixed diagnoses *(d*+ = .08), *Q*(1) = 2.43, *p* = .12. An insufficient number of studies recruited participants who were diagnosed with bipolar disorder (*k* = 2) for us to be able to compare the effect of interventions among such samples with those targeting other samples.

####  Positive Symptoms

##### Nature of the intervention

Contact with a professional, researcher or peer moderated the effects of self-help interventions on positive symptoms, with guided self-help interventions being significantly more effective (*d+* = .78) than pure self-help interventions (*d+* = .19), *Q*(1) = 8.10, *p* = .004 (see Table 5). The impact of the theoretical basis of self-help interventions on positive symptoms was not investigated due to an insufficient number of studies to allow comparison (psychoeducation: *k* = 2, behavioural: *k* = 9, support group: *k* = 1). However, intervention complexity was also found to moderate treatment effects, with more complex interventions (*d+* = .96) being associated with significantly larger effect sizes than simple interventions (*d+* = .21), *Q*(1) = 11.53, *p* < .001. Mode of delivery also moderated the effects of self-help interventions on positive symptoms. Remote delivery was associated with significantly smaller effects than interventions delivered face-to-face (*d+* = .19 vs. *d+* = .78 respectively), *Q*(1) = 8.13, *p* = .004.

##### Study design

There was no significant difference between studies which employed a repeated measures design (*d+* = .56) and those using an independent group design (*d+* = .36) in terms of their effects on positive symptoms, *Q*(1) = .94, *p* = .33. Follow-up point did not have a significant impact on effect sizes, *β* = .39, *t* = 1.35, *p* = .21, nor did study quality, *β* = .37, *t* = 1.26, *p* = .24 or publication date, *β* = -.36, *t* = -1.21, *p* = .25 (see Table 6).

##### Sample characteristics

Effect sizes did not differ significantly between studies recruiting participants with a psychosis diagnosis *(d*+ = .47) and those recruiting participants with mixed diagnosis *(d*+ = .27), *Q*(1) = .59, *p* = 0.59. No studies assessed the effect of a self-help intervention on positive symptoms on participants with bipolar disorder.

####  Negative Symptoms

The number of studies reporting the effects of self-help interventions on negative symptoms was relatively low (*k* = 5). Consequently it was not possible to investigate whether any of the categorical variables moderated the impact of self-help interventions on the negative symptoms of psychosis (see Table 5). We did; however, run meta-regression to examine the effect of continuous moderators on effect sizes and found that neither follow-up point, *β* = .83, *t* = 2.60, *p* = .08, study quality, *β* = .32, *t* = .57, *p* =.61, or publication date, *β* = .16, *t* = .27, *p* =.80, significantly influenced the impact of interventions on negative symptoms (see Table 6).

####  Associated Outcomes

##### Nature of the intervention

The effect of the interventions on outcomes associated with psychosis did not differ between guided self-help interventions (*d+* = .11) and pure interventions involving no contact (*d+* = .15), *Q*(1) = 0.14, *p* = .71 (see Table 5). Furthermore, intervention complexity, *Q*(1) = .00, *p* = .95, and mode of delivery, *Q*(1) = .03, *p* = .86, did not moderate the effect of self-help on associated outcomes. Finally, there were no significant differences between the effects of interventions based on behavioural (*d+* = .35), psychoeducation (*d+* = .10), or peer support self-help groups (*d+* = .09) on associated outcomes, *Q*(1) = .01 to 2.29, *p* = 0.12.

##### Study design

Study design (repeated measures vs. independent group designs) did not moderate the effect of self-help interventions on associated outcomes, *Q*(1) = 2.65, *p* = .10, nor did publication date, *β* = -.33, *t* = -1.40, *p* = .18. There was also no significant association between the length of follow-up and effect sizes, *β* = -.12, *t* = -.46, *p* = .65 (see Table 6). However, study quality did moderate the effect of self-help interventions on associated outcomes, with higher quality studies being associated with smaller effect sizes, *β* = -.55, *t* = -2.67, *p* = .02.

##### Sample characteristics

The effect of self-help interventions on outcomes reported by studies recruiting participants with a diagnosis of psychosis (*d+* = .15) did not differ significantly from those reported by studies recruiting participants with a diagnosis of bipolar disorder (*d+* = .08), *Q*(1) = .23, *p* = .63, or studies recruiting both participants with diagnoses of psychosis and bipolar disorder (i.e., mixed diagnoses) (*d+* = .13), *Q*(1) = .04, *p* = .84. Effect sizes among studies recruiting participants diagnosed with bipolar disorder (*d+* = .07) did not differ significantly compared with studies recruiting participants with mixed diagnoses (*d+* = .13), *Q*(1) = .12, *p* = .73.

Table 5

*Dichotomous Moderators of the Effects of Self-Help Interventions*

 Moderator *k N d+ Q*

**Effects of self-help interventions on overall symptoms**

 *Contact time* 1.18

 Guided self-help 9 423 .43

 Pure self-help 10 304 .27

 *Complexity* 11.64\*\*\*

 Single 15

 Multiple

 *Theoretical basis (1 vs. 2)* 1.79

1. Psychoeducation 7 198 .24
2. Behavioural 10 355 .48
3. Peer-support 2

 *Diagnosis (1 vs. 3)* 2.43

1. Psychosis 11 537 .39
2. Bipolar disorder 2
3. Mixed diagnoses 5 127 .08

 *Mode of delivery* 2.18

 Face-to-face 8 403 .48

 Remote 11 324 .25

 *Methodological design* .22

 RCT 9 441 .35

 Repeated measures 10 286 .42

**Effects of self-help interventions on positive symptoms**

 *Contact time* 8.10\*\*

 Guided self-help 5 172 .78

 Pure self-help 7 223 .19

 *Complexity* 11.53\*\*\*

 Single 9 259 .21

 Multiple 3 136 .96

 *Theoretical basis*

1. Psychoeducation 2
2. Behavioural 9 328 .44
3. Peer-support 1

 *Diagnosis (1 vs. 3)* .59

1. Psychosis 8 299 .47
2. Bipolar disorder 0
3. Mixed diagnoses 3 80 .27

 *Mode of delivery* 8.13\*\*

 Face-to-face 5 172 .78

 Remote 7 223 .19

 *Methodological design* .94

 RCT 5 173 .36

 Repeated measures 7 222 .56

**Effects of self-help interventions on negative symptoms**

 *Contact time*

 Guided self-help 4 168 .37

 Pure self-help 1

 *Complexity*

 Single 5 188 .37

 Multiple

 *Theoretical basis*

1. Psychoeducation 1
2. Behavioural 4 168 .37
3. Peer-support

 *Diagnosis*

1. Psychosis 3 124 .47
2. Bipolar disorder 0
3. Mixed diagnoses 2

 *Mode of delivery*

 Face-to-face 1

 Remote 4 168 .37

 *Methodological design*

 RCT 3 124 .37

 Repeated measures 2

**Effects of self-help interventions on associated outcomes**

 *Contact time* .14

 Guided self-help 9 762 .11

 Pure self-help 9 565 .15

 *Complexity* .00

 Single 14 949 .13

 Multiple 4 348 .12

 *Theoretical basis (1 vs. 2)* 2.29

 *(1 vs. 3)* .01

 *(2 vs. 3)* 2.40

1. Psychoeducation 9 585 .10
2. Behavioural 6 187 .35
3. Peer-support 3 555 .09

 *Diagnosis (1 vs. 2)* .23

 *(1 vs. 3)* .04

 (2 vs. 3) .12

1. Psychosis 6 437 .15
2. Bipolar disorder 4 158 .08
3. Mixed diagnoses 8 641 .13

 *Mode of delivery* .03

 Face-to-face 6 456 .16

 Remote 11 687 .14

 *Methodological design* 2.65

 RCT 11 1137 .09

 Repeated measures 7 190 .35

\*\**p* < .01, \*\*\**p* < .001.

Table 6

*Continuous Moderators of the Effects of Self-Help Interventions*

 Moderator *M SD β t*

**Effects of self-help interventions on overall symptoms**

 Follow-up point 13.89 20.89 .44 2.03

 Study quality 15.79 3.82 -.33 -1.46

 Publication date 2007.47 5.69 -.19 -0.80

**Effects of self-help interventions on positive symptoms**

Follow-up point 15.33 22.75 .39 1.35

 Study quality 14.17 2.33 .37 1.26

 Publication date 2007.33 6.23 -.36 -1.21

**Effects of self-help interventions on negative symptoms**

Follow-up point 5.60 7.80 .83 2.60

 Study quality 13.60 1.52 .32 .57

 Publication date 2010.60 1.67 .16 .27

**Effects of self-help interventions on associated outcomes**

Follow-up point 15.33 19.56 -.12 -.46

 Study quality 17.72 4.31 -.55 -2.67\*

 Publication date 2008.50 5.75 -.33 -1.40

\* *p* < .05

## Discussion

The efficacy of self-help interventions for mental health conditions other than psychosis has received significant attention. For example, medium-sized effects of self-help interventions have been reported on both depression and anxiety symptoms (for reviews, see Bower et al., 2001; Gellatly et al., 2007; Haug et al., 2012; Hirai & Clum, 2006; Marrs, 1995; Spek et al., 2007). However, there is a need for a starting point on which to base future research into self-help for psychosis (Lewis et al., 2003). In an effort to provide this starting point, we conducted a systematic review with meta-analysis to investigate the impact of self-help interventions in this area. Following a search of the literature, 24 studies investigating the efficacy of self-help interventions for psychosis were identified for inclusion. Four separate meta-analyses were conducted; on overall symptoms, positive symptoms, negative symptoms, and associated outcomes such as wellbeing, levels of distress, and depression, respectively.

The findings suggest that self-help interventions have a small-to-medium-sized beneficial effect on overall symptoms and a medium-sized effect on positive symptoms. We also found a less robust, but still small-to-medium-sized effect of self-help interventions on negative symptoms and a small-sized effect on associated outcomes. However, it should be noted that relatively few studies investigated the effect of self-help interventions on negative symptoms and so this effect should be interpreted with caution. The evidence reported in the present meta-analysis, therefore, suggests that self-help interventions can have comparable effects on psychosis as have been described for depression and anxiety in other reviews (e.g., Bower et al., 2001; Gellatly et al., 2007; Haug et al., 2012; Hirai & Clum, 2006; Marrs, 1995; Spek et al., 2007).

Along with similar effect sizes, self-help interventions for psychosis are generally similar in nature to those used for depression and anxiety. For example, both offer interventions that are designed to be conducted predominantly independently of support in either guided or unguided formats. In the current review, around half of the studies included used guided interventions, a figure which is comparable to meta-analyses of self-help for depression and anxiety (Gellatly et al., 2007; Haug et al., 2012; Hirai & Clum, 2006; Spek et al., 2007). Furthermore, self-help interventions for psychosis, much like those offered for depression and anxiety, utilize both face-to-face and remotely delivered interventions using traditional pen and paper methods as well as computerised and e-health interventions. There is however one key difference between extant self-help interventions for psychosis and those that have been used for depression and anxiety. Self-help interventions for depression and anxiety are predominantly based on the principles of CBT (Cuijpers & Schuurmans, 2007; van't Hof et al., 2009), whereas to date only two studies (8%) of self-help for psychosis have based the intervention on the principles of CBT (Gottleib et al., 2013; Granholm et al., 2011). Instead, behavioural approaches to self-help for psychosis tend to focus more on the implementation of coping strategies (e.g. thought stopping and audio relaxation) rather the cognitive restructuring seen in CBT. In summary, self-help interventions for psychosis are broadly comparable to those used for anxiety and/or depression, although less likely to draw on the principles of CBT. These differences may, however, simply reflect a field in its infancy and should not necessarily constrain the nature of interventions in the future.

The effect of self-help interventions for psychosis reported here are also broadly comparable to the often-cited effect of CBT for psychosis (d+ = 0.40; Burns et al., 2014; van der Gaag et al., 2014). The development and evaluation of self-help interventions for psychosis is still in its infancy, especially when compared to similar interventions for common mental health problems. However, for the most part, the effect sizes reported in the present review proved statistically significant, robust, and were homogenous. We therefore contend that the further development and testing of self-help interventions for psychosis is warranted. This would seem to be especially important with respect to negative symptoms where the current evidence base is relatively limited.

On the basis of these findings, we suggest that the development of self-help for psychosis could follow a similar approach to that suggested by Jorm and Griffiths (2006) in relation to the use of self-help for depression. Jorm and Griffiths suggest that individuals presenting with sub-clinical or threshold levels of depression are at risk of developing more serious, clinical forms of depression. Consequently, these people should be a target for early preventative action. A similar ethos has been applied to psychosis (Marshall & Rathbone, 2011; McGorry et al., 2008) and it is clear that psychotic symptoms are experienced by a substantial proportion of the general population (Krabbendam et al., 2004; van Os et al., 2009). We therefore suggest that self-help interventions might be investigated further as a viable treatment approach for those presenting with mild to moderate symptoms of psychosis as part of an early intervention strategy.

### What Factors Influence the Effectiveness of Self-help Interventions for Psychosis?

The present review found that guided self-help interventions tended to be associated with larger effect sizes than pure self-help interventions. Furthermore, levels of contact significantly moderated the effect of self-help interventions on positive symptoms, while the effect on overall symptoms followed a similar trend, albeit not reaching statistical significance. These findings are consistent with previous research focusing on other mental health problems, which tends to find that self-help interventions that incorporate contact are more beneficial than interventions with less contact (Gellatly et al., 2007; Marrs, 1995). Guided interventions do appear, therefore, to offer superior efficacy, both in previous reviews of self-help and in the current meta-analysis. However, the benefits of guided interventions need to be balanced against higher costs and limited availability (Berger et al., 2011). Given that pure, unguided self-help interventions can offer a small improvement in symptoms research might further explore the efficacy of pure, unguided self-help interventions for psychosis.

The difference between guided and pure forms of self-help raises several pertinent questions, one of which being what is the minimum amount of contact that should accompany self-help in order to get the maximum benefit? Unfortunately, there are several reasons why the answer to this question is beyond the analysis presented here. Firstly, many of the studies in the current review do not report how much contact was involved. Consequently, our analysis of the impact of contact on effect sizes was restricted to simply comparing pure versus guided self-help interventions, rather than a continuous measure of the amount of contact. Second, the nature of contact differed across the primary studies. For example, many of the studies using contact did so in a self-help peer-support group setting, which may be different to studies that use contact to support independent learning. There have been calls for more research into the effects of contact on the impact of self-help interventions for anxiety disorders (Newman et al., 2003), depression (Newman et al., 2011), and obsessive compulsive disorder (Mataix-Cols & Marks, 2006). We would echo this call in relation to self-help interventions for psychosis and suggest that future studies investigating the efficacy of such interventions follow the recommendations of Newman et al. (2003), who proposed that researchers should assess the efficacy of guided interventions using varying degrees of contact.

The complexity of the intervention also influenced effect sizes. Specifically, interventions using a variety of self-help techniques in conjunction (such as interventions that combined elements of CBT, psychoeducation, and relaxation) were associated with larger effect sizes than interventions using a single self-help technique (e.g., relaxation only). This is perhaps not surprising given that previous research has advocated the use of multiple techniques (Buccheri et al., 2007; Buccheri et al., 2004; Carter et al., 1996; Trygstad et al., 2002), indeed this finding informed the development of the self-help intervention tested later in Chapter 5. However, more complex and multi-faceted interventions bring with them the potential for reduced adherence, something that is a serious concern for self-help interventions (Christensen, Griffiths, & Farrer, 2009; Titov et al., 2013). For example, a systematic review of Internet-based self-help interventions for depression and anxiety conducted by Christensen et al. (2009) reported that, among other factors, treatment length, perceived burden of the intervention, and time constraints were all associated with higher rates of attrition.

The impact of the theoretical basis of self-help interventions on their efficacy was difficult to examine due to the relatively small number of studies representing each theoretical basis. For example, we were unable to compare the effects of interventions with different theoretical bases on positive or negative symptoms separately. Having said this, there were no significant differences between the effects of self-help interventions based on psychoeducation, support groups and behavioural principles on overall symptoms and associated outcomes. Self-help interventions based on CBT (included under the category of behavioural interventions in the current review) are widely used for common mental health problems. However they are underrepresented as a theoretical basis for developing self-help interventions for psychosis with only two interventions based on the principles of CBT identified for inclusion in the current review. It is hoped that more research testing the effects of self-help interventions based on peer support self-help groups, CBT, and psychoeducation may allow for a greater understanding of which theoretical bases are most effective.

The mode of delivery did not moderate the effect of self-help interventions on overall symptoms or associated outcomes, meaning that remotely delivered, technology assisted online interventions for those experiencing psychosis can be an effective treatment option. Technology assisted therapies have many benefits including increasing access to services by reducing logistic barriers, increased portability (such as technologies using hand-held devices), and improved self-monitoring (Newman, Consoli, & Taylor, 1997; Palmer, Bor, & Josse, 2000). In addition, many people who would benefit from engagement with mental health services simply decide not to, or fail to continue or to fully participate due to the stigma associated with mental health treatments (Corrigan, 2004; Franz et al., 2010). Self-help interventions for psychosis (particularly remotely delivered interventions) have the potential to promote engagement with mental health services at an early point in the onset of the experience of psychosis as the stigma associated with these interventions can be lower (Mittal, Sullivan, Chekuri, Allee, & Corrigan, 2012; Watson, Corrigan, Larson, & Sells, 2007).

It was difficult to compare the effect of diagnosis on intervention efficacy due to an insufficient number of studies focusing only on participants with bipolar disorder. However, where we were able to investigate the impact of diagnosis on intervention efficacy we found no significant differences. This is perhaps not surprising given the well-documented difficulties associated with making clear and distinct diagnoses based on symptoms associated with psychosis (Bentall et al., 1988; Craddock & Owen, 2005; Van Os, 2010); and many services combine psychosis and bipolar disorder when providing treatment provision (Citrome & Yeomans, 2005; Jolley et al., 2015). As a result, we cautiously conclude that the self-help interventions reviewed here are likely to be equally appropriate for the experiences associated with both psychosis and bipolar disorder diagnoses, but accompany this conclusion with a call for more research focusing specifically on the value of self-help interventions for people with bipolar disorder.

Consistent with previous reviews of self-help for mental health problems (Bower et al., 2001; Scogin et al., 1990), study quality did not moderate the effect of self-help interventions on overall symptoms or positive symptoms alone in the present review. However, study quality did moderate the effect of interventions on associated outcomes (lower quality studies were associated with larger effect sizes). With this in mind, future evaluations of self-help for psychosis should prioritize well-constructed, high quality research designs. These designs should take the form of randomised controlled trials, comparing the efficacy of self-help interventions against different control groups (such as treatment as usual, wait-list controls). In addition, future research should consider blinding participants and researchers to group assignment. Knowledge of group assignment in clinical trials can affect participant responses and induce researcher bias, potentially giving a skewed representation of treatment efficacy (Schulz, Chalmers, & Altman, 2002). For example, a recent meta-analysis by (Jauhar et al., 2014) reported that the effect of cognitive behavioural therapy on the symptoms of psychosis was lower when assessments were made by interviewers blind to treatment allocation. By ensuring high quality investigation of the efficacy of self-help for psychosis, inflated effect sizes may be avoided, thereby providing a clearer view of the effect of self-help interventions on outcomes.

Finally, the present review found that self-help interventions had more substantive effects on the symptoms of psychosis than on outcomes associated with the experience of psychosis such as quality of life and depression. Therefore, it appears that reductions in symptoms do not necessarily translate into comparable reductions in associated outcomes. Similar findings have been reported by Fervaha, Agid, and Takeuchi (2015), who examined the characteristics of individuals with a diagnosis of schizophrenia who report being satisfied with their life in general. The authors found that those with schizophrenia experienced a high level of life satisfaction despite concurrent severe mental health difficulties and functional deficits. One possible explanation for the finding that symptoms do not necessarily translate into comparable reductions in associated outcomes could be the relative neglect of negative symptoms. Indeed, only five studies in the present review examined the effect of self-help interventions on negative symptoms. Negative symptoms are; however, closely related to the associated outcomes studied in the current review. For example, Wegener et al. (2005) reported that 43% of the variance in quality of life measures among those with psychosis can be explained by levels of depression, general psychopathology and negative symptoms, while several longitudinal studies support the notion that negative symptoms are important determinants of quality of life in those with psychosis (Ho et al., 1998; Priebe et al., 2000). We therefore reiterate our call for further research to develop and test the efficacy of self-help interventions targeting the negative symptoms of psychosis, as such interventions may be most likely to influence outcomes.

### Directions for Future Research

One area highlighted by the current review for possible future research is the development and evaluation of self-help interventions based on CBT. Only two studies in the present review tested the effects of a CBT based intervention for psychosis (Gottleib et al., 2013; Granholm et al., 2011). CBT has been shown to be effective for those with psychosis (for reviews, see Burns et al., 2014; van der Gaag et al., 2014; Wykes et al., 2014). However, due to a lack of current research, it is not known whether this efficacy translates into a self-help format. Further research investigating the use of self-help interventions for psychosis based on the principles of CBT would go some way to addressing this knowledge gap. In much the same way, the current review found that relatively few studies examined the effects of peer-support self-help groups. Peer-support self-help groups are often thought to be synonymous with self-help approaches for mental health problems and have grown dramatically during the past several decades (Mohr, 2004; Wuthnow, 1994). However, due to a lack of studies, we were unable to compare their efficacy to other theoretical bases. Further studies of this nature would seem to be a priority for future research.

### Conclusion

The meta-analysis described in the present chapter demonstrates that self-help interventions for psychosis have potential, especially guided interventions. However, further research is needed before self-help can be recommended as part of routine treatment for psychosis. Self-help interventions have been proposed as a key part of stepped care models of depression and anxiety in both the USA and the UK (Scogin et al., 2003) on the basis of strong empirical research. Therefore, further high quality studies that investigate the efficacy of self-help for psychosis will help to develop a substantive evidence base from which the use of self-help for psychosis may be recommended with similar confidence. Chapter 5 aims to provide such a high quality randomised controlled trial by investigating the effect of a self-help intervention based on the principles of CBT on a common symptom of psychosis; namely, paranoia. The intervention is novel in targeting a relatively understudied potential correlate of psychosis –sleep disturbance – in a bid to affect change in levels of paranoid thinking. Therefore, in an effort to build the empirical case for this focus, the next chapter explores the link between sleep difficulties and paranoid thinking.

# Sleep difficulties and paranoid thinking: The potential of sleep as a target for intervention

## Introduction

In 1887, Andrew Dickson White described the practice of “tortura insomniae”, an unfortunate procedure which involved depriving those accused of witchcraft of sleep in a bid to rid them of their delusions (White, 1887). This deprivation of sleep was intended as a ‘treatment’. However, it was noted that symptoms resembling psychosis would be exacerbated by prolonged periods of wakefulness, with temporary delusions often becoming chronic insanity. Sixty-five years later, West, Cornelis, Janszen, and Lester (1962) commented that, of the psychosis-like symptoms which often accompany sleep deprivation, “gross delusional thinking, usually paranoid, becomes increasingly prominent” (p. 69). It is clear that sleep and the experience of paranoia have a long history. The current chapter focuses on one particular aspect of sleep disturbance – insomnia – and its relationship with paranoid thinking. Insomnia typically includes a difficulty initiating and/or maintaining sleep (including disrupted sleep and/or waking early, Ohayon, 2002). We follow Freeman and Garety’s (2000) definition of paranoia as a person’s belief “that harm is occurring, or is going to occur, to him or her” and “that the persecutor has the intention to cause harm” (p. 412).

Both insomnia and paranoia are relatively common. For example, Ohayon (2002) reported that around one third of the general population experience at least one symptom of insomnia (based on DSM-IV criteria). More generally, 42% of a sample of the UK population endorsed an item in the Adult Psychiatric Morbidity Survey asking if they have had problems getting to sleep in the previous month (Bebbington et al., 2007). The experience of paranoia in the general population is also common with numerous studies reporting incidences of paranoid thinking (Johns & van Os, 2001; Linscott & van Os, 2010). For example, Freeman et al. (2005) reported that of a general population sample of 1202, approximately one third reported experiencing paranoid thoughts. In short, both insomnia and the experience of paranoia are relatively common in the general population.

### The relationship between insomnia and paranoia

Problems sleeping have been associated with numerous physical and psychological complaints (for reviews, Baglioni et al., 2011; Cappuccio, Cooper, D'Elia, Strazzullo, & Miller, 2011; Cappuccio, D'Elia, Strazzullo, & Miller, 2010; Fortier-Brochu, Beaulieu-Bonneau, Ivers, & Morin, 2012; Taylor, Lichstein, & Durrence, 2003). Recent research has extended this work to point to an association between insomnia and paranoid thinking. For example, Freeman, Pugh, Vorontsova, and Southgate (2009) found a strong association between insomnia and paranoia in both community and clinical samples. Freeman et al. (2010) found a similar relationship using data from the British National Survey of Psychiatric Morbidity (Singleton, Bumpstead, O’Brien, Lee, & Meltzer, 2001), finding that insomnia was associated with a two to threefold increase in the frequency of paranoid thoughts. Interestingly, in both of these studies, the strength of the relationship between insomnia and paranoia was weaker when levels of depression and anxiety were taken into account, suggesting that the relationship may be explained, in part, by increases in negative affect. The importance of negative affect in the relationship between insomnia and paranoia has been highlighted further using longitudinal methodology. For example, Freeman et al. (2012) found that insomnia, worry, anxiety, and depression all predicted new and persisting paranoid thinking, suggesting a causal role for insomnia and negative affect in paranoia.

### Limitations of extant research

Initial evidence for a relationship between insomnia and paranoid thinking is compelling. However, there are several methodological weaknesses with the existing evidence base. First, the relationship between sleep and paranoia has been investigated using only self-reported measures of sleep quality. Discrepancies between self-report and objective measures of sleep are common (Akerstedt et al., 2002; Argyropoulos et al., 2003; Baker, Maloney, & Driver, 1999; Rotenberg, Indursky, Kayumov, Sirota, & Melamed, 2000; Vitiello, Larsen, & Moe, 2004) and there is a tendency for people with insomnia to overestimate sleep latency and underestimate total sleep time relative to objective measures (Harvey & Tang, 2012). Given that self-report and objective measures of sleep quality may differ, it would be valuable to investigate whether actual or perceived sleep quality (or both) are associated with paranoia. Second, insomnia has so far been conceptualised as a single construct. However, problems with sleep onset and sleep maintenance (two distinctive facets of insomnia: Ohayon, 2002) may be differentially related to affective experiences and paranoia. Finally, previous research has tended to use relatively limited measures of paranoia. For example, Freeman et al. (2010; 2012) used only two items taken from the Psychosis Screening Questionnaire to capture the experience of paranoia. As Freeman et al. (2012) pointed out, these questions “provided a limited capture of the variety of paranoid ideation” (p. 1202).

There are also unresolved conceptual issues – specifically, it is unclear whether insomnia has a direct impact on paranoia, or whether negative affect mediates (at least some of) the effects of insomnia on paranoia. Sleep problems are often associated with anxiety and depression (Taylor, Lichstein, Durrence, Reidel, & Bush, 2005) and have been shown to predict negative affect more generally (Baglioni et al., 2011). Thus, one explanation for the relationship between insomnia and paranoia is that difficulties initiating and/or maintaining sleep could lead to negative affect that, in turn, contributes to the formation and maintenance of paranoid thinking (a fully mediated model). Alternatively (or in addition), the distress that insomnia causes, along with the opportunities for reflection that insomnia presents, can effectively create a situation where rumination and worry are incorrectly attributed to an external threat (Harvey, Tang, & Browning, 2005; Taylor et al., 2005). Thus, insomnia could directly lead to the formation and maintenance of paranoid thinking. It is also important to note that the possibility of direct (unmediated) effects, do not preclude the possibility that insomnia also has an indirect effect through negative affect as has been reported in previous research (i.e., a partially mediated model) (Freeman et al., 2010; Freeman et al., 2009; Freeman et al., 2012).

### The present research

The present research aims to address the limitations identified above by; (i) exploring whether objective indices of sleep quality are associated with negative affect and the experience of paranoia, (ii) improving the measurement of insomnia and paranoia by using multi-item measures with established reliability and validity and by conducting exploratory and confirmatory factor analyses; and (iii) investigating direct, fully, and partially mediated models of the relationship between insomnia, negative affect, and paranoia using structural equation modelling.

## Method

### Participants

*N* = 397 participants were recruited via an email to a list of volunteers at the University of Sheffield. Participants with any missing data (*N* = 49) were removed from the analysis. The 348 participants in the final sample were aged between 18 and 77 (*M* = 36.49, *SD* = 12.76) and 84 (24%) were male. MANOVA revealed that there were no significant differences on measures of insomnia, negative and paranoia between male and female participants, *F*(4, 430) =.01, *p* = .48. Of the 348 participants, 91 (26%) wore a sleep monitor for 7 days. The majority of these participants were female (79%) and ranged in age from 18 to 60 (*M* = 29.88, *SD* = 12.95). MANOVA revealed no significant differences between those who wore, versus did not wear, a sleep monitor in terms of age, severity of insomnia, paranoia, and negative affect, *F*(4, 430) = 1.68, *p* = .15. Chi square revealed no significant gender differences between the two groups, *X2*(1) = 0.43, *p* = .51.

### Procedure

Data collection took place in two stages. First, participants were invited via email to complete a series of online questionnaires investigating how their sleep was related to their thoughts, feelings and behaviours. These online questionnaires contained self-report measures of insomnia, paranoia, and negative affect (detailed below). Participants were then asked if they would be willing to wear a sleep monitor to record their sleeping patterns for 7 consecutive nights. Participants who agreed were met by the researcher who provided instructions on how to use the sleep monitor and answered any questions. Ethical approval was granted by The Department of Psychology Research Ethics Committee at the University of Sheffield.

### Measures

Paranoid thoughts were measured using Part B of the Green Paranoid Thoughts Scale (GPTS-B; Green et al., 2008) that focuses on persecutory thoughts. Participants were asked to rate the extent to which they agreed with sixteen items over the previous month (e.g., “Certain individuals have had it in for me” and “It was diﬃcult to stop thinking about people wanting to make me feel bad”) on a 5-point scale with higher scores indicating higher levels of paranoia. The GPTS has been validated for use in both clinical and non-clinical populations and has been shown to have good internal consistency and validity (Green et al., 2008).

Negative affect was measured using the shortened form of the Depression, Anxiety, and Stress Scale (DASS-21; Henry & Crawford, 2005). Participants were asked to identify (on a 4-point scale), to what extent they agreed with items assessing facets of negative affect over the past week, with higher scores indicating higher levels of negative affect. For example, 7 questions were concerned with feelings of depression (e.g. “I felt down-hearted and blue” and “I couldn’t seem to experience any positive feeling at all”). A further 7 items asked participants about feelings of anxiety (e.g. “I was aware of the action of my heart” and “I experienced breathing difficulty”. Finally, 7 questions aimed to explore feelings of stress (e.g. “I found it difficult to relax” and “I was intolerant of anything that kept me from getting on”). The DASS-21 has been validated for use in both clinical and non-clinical populations as an accurate, reliable and valid measure of negative affect.

Insomnia was measured using the 8-item insomnia subscale of the Sleep-50 questionnaire (Spoormaker, Verbeek, van den Bout, & Klip, 2005). Participants were asked to rate (on a 4-point scale) the extent to which statements about their sleep applied to them within the last four weeks. For example, some items were concerned with initially falling to sleep (e.g. “I worry so much it prevents me from falling asleep” and “I find it difficult to fall asleep”) whereas others were concerned with staying asleep (e.g. “I wake up during the night” and “I sleep lightly”). The insomnia subscale of the Sleep-50 has been validated as an accurate, valid and reliable tool to detect insomnia with high internal consistency and good test-retest reliability.

Participants who took part in the second stage of data collection were asked to wear a Zeo Sleep Manager that uses a dry fabric, silver coated headband sensor to collect single channel electrophysiological recordings of eye movements, electroencephalography (EEG), and muscle tension. These signals are sent wirelessly from the headband sensor to a small base unit, much like a radio alarm clock, where they are processed and amplified in real time using an artificial neural network. The Zeo Sleep Manager has been validated as an accurate device for measuring sleep patterns in adults when compared against polysomnography and actigraphy (Shambroom, Fabregas, & Johnstone, 2012; Tonetti et al., 2013). This sleep monitor allowed us to obtain objective measures of total sleep time, sleep latency, and the number of awakenings each night after sleep onset.

### Approach to Analysis

A two-step process was used to analyse the self-report data on sleep quality, negative affect and paranoia. First, an exploratory factor analysis (EFA) was undertaken on one half of the data followed by confirmatory factor analysis (CFA) on the other half. This approach allowed us to explore the latent factor structure and also enabled the fit of the factor structure to be assessed on a second sample. Following these analyses, two models of the relationships between sleep quality, paranoia, and negative affect were evaluated using structural equation modelling (SEM). The relationship between objective measures of sleep quality, negative affect and paranoia was explored using regression analysis as the number of participants providing objective sleep data was too low to permit the use of SEM (Wolf, Harrington, Clark, & Miller, 2013).

## Results

### Exploratory Factor Analysis

Principal components analysis (PCA) was used in SPSS v21 (IBM Corp, 2012) in order to better understand the latent structure of each scale. In addition, an R-menu (v2.0) developed by Basto and Pereira (2012) was used in order to utilize more contemporary factor retention methods otherwise not available in SPSS. Direct oblimin rotation was used, which allows the extracted factors to correlate. The analysis used several methods to decide on the appropriate number of factors to retain including the K1 rule (Kaiser, 1960), the scree plot (Catell, 1966), parallel analysis (Horn, 1965), Velicer’s (1976) minimum average partial (MAP) test, the optimal co-ordinates test (an objective version of the scree plot: Raiche, Roipel, & Blais, 2006) and the comparative data technique (Ruscio & Roche, 2012).

#### The Depression, Anxiety, Stress Scale (DASS-21)

One item from the DASS-21, “I was aware of dryness of mouth”, did not correlate with any other items (*r* < .30). Therefore, following Field’s (2009) recommendations, this item was removed and exploratory factor analysis was applied to the remaining 20-items. Four items were removed as they had substantive cross loadings[[3]](#footnote-3) with other factors leaving 16 items. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .92 and Bartlett’s test of sphericity (*X*2 (120) = 1493.39, *p* < .001) indicating that the data was suitable for principle component analysis (PCA). A clear and simple three factor solution was extracted that explained 63.68% of the variance: Factor 1 represented experiences of depression, Factor 2 represented anxiety, and Factor 3 represented feelings of stress (see Table 7). All factors showed good internal reliability (α = .92, .73, and .82, respectively).

Table 7

*Exploratory Factor Analysis of the Depression, Stress, Anxiety Scale (DASS-21, N = 166)*

 **Rotated Factor Loadings**

**Item Depression Anxiety Stress Communalities**

I felt that I had nothing to look forward to .87 .80

I felt that life was meaningless .85 .66

I was unable to become enthusiastic about anything .84 .75

I couldn’t seem to experience any positive feeling at all .79 .81

I felt I wasn’t worth much as a person .78 .69

I found it difficult to work up the initiative to do things .70 .53

I felt downhearted and blue .70 .64

I was aware of the action of my heart (e.g., sense of heart rate increase) .84 .73

I experienced trembling (e.g., in the hands) .63 .45

I experienced breathing difficulty .61 .53

I felt I was close to panic .55 .63

I found it hard to wind down .87 .72

I found it difficult to relax .76 .71

I was intolerant of anything that kept me from getting on .64 .59

I tended to overreact to situations .58 .54

I was worried about situations in which I might make a fool of myself .55 .44

Cronbach’s alpha coefficient .92 .73 .82

*Note*: Factor loadings below .36 according to Stevens (2002) are not substantive values based on a sample size and have been omitted

#### Sleep-50 Insomnia Subscale

Correlations between items in the insomnia subscale of the Sleep-50 questionnaire were within the acceptable range (.30 < *r* < .85), meaning that all items were suitable for PCA. Sampling adequacy was verified (KMO = .78) and Bartlett’s test of sphericity was significant, *X*2(28) = 407.58, *p* < .001. A clear two factor solution explaining 59.40% of the variance was derived (see Table 8). The items loading on Factor 1 related to sleep onset (the time taken to fall to sleep) while the items loading on Factor 2 represented sleep maintenance (staying asleep after sleep onset). Both factors had good internal reliability (α = .77 and .74, respectively).

Table 8

Exploratory Factor Analysis of the Insomnia Subscale of the Sleep-50 Questionnaire (*N* = 166)

 **Rotated Factor Loadings**

**Item Sleep Onset Sleep Maintenance Communalities**

I worry so much it prevents me from falling asleep .91 .79

I find it difficult to fall asleep .86 .72

I find it hard to relax .80 .63

I sleep too little .43 .35

I wake up during the night .80 .59

I wake up early and cannot get back to sleep .74 .53

After waking up during the night, I fall asleep slowly .73 .69

I sleep lightly .67 .45

Cronbach’s alpha coefficient .77 .74

*Note*: Factor loadings below .36 according to Stevens (2002) are not substantive values based on a sample size and have been omitted

#### Green Paranoid Thoughts Scale – Part B

Correlations between items in Part B of the Green Paranoid Thoughts Scale were within the acceptable range (.30 < *r* < .85), meaning that all items were suitable for PCA. Sampling adequacy was verified (KMO = .80) and Bartlett’s test of sphericity was significant, *X*2(45) = 1027.81, *p* < .001. A single factor solution was obtained comprising of items with factor loadings greater than .36 explaining 50.76% of the variance (see Table 9). These items were parcelled together to create a composite score for paranoia that had good internal reliability (α = .88).

Table 9

*Summary of Retained Items and Communalities after Extraction for Part B of the Green Paranoid Thoughts Scale (N = 166)*

**Item Factor Loading Communalities**

People have been hostile towards me on purpose .86 .75

It was difficult to stop thinking about people wanting to make me feel bad .82 .67

I was preoccupied with thoughts of people trying to upset me deliberately .81 .66

I was annoyed because others wanted to deliberately upset me .79 .63

Certain individuals have had it in for me .66 .43

I was angry that someone wanted to hurt me .63 .40

I was distressed by people wanting to harm me in some way .63 .40

I was sure certain people did things in order to annoy me .63 .39

The thought people were persecuting me played on my mind .58 .34

I was distressed by being persecuted .55 .30

Cronbach’s alpha coefficient .88

### Confirmatory Factor Analyses

CFA was conducted using AMOS v22 (Arbuckle, 2013) based on a covariance matrix consisting of parcelled items derived from the previous exploratory factor analysis (see Table 10). Normality checks revealed that, as is often the case for research using Likert-type scales, the data was not normally distributed (multivariate kurtosis = 84.92, C.R. = 33.87). Therefore, maximum likelihood estimation was used in combination with bootstrapping procedures drawn from 10,000 samples to account for the non-normal distribution of the data.

Table 10

*Covariances and Correlations between Observed Variables on Which the CFA Model Was Based*

SO1 SO2 SM1 SM2 P1 P2 P3 NA1 NA2 NA3 NA4

SO1 **1.73 1.20 .61 .85 .57 .48 .35 1.24 1.22 1.10 1.23**

SO2 .75 **1.20 .73 .94 .55 .46 .28 1.28 1.08 1.05 1.05**

SM1 .36 .50 **1.70 1.21 .21 .20 .19 .67 .46 .41 .50**

SM2 .49 .59 .71 **1.71 .24 .38 .23 .64 .53 .45 .48**

P1 .24 .25 .09 .10 **3.25 2.60 1.73 1.49 1.61 2.09 1.66**

P2 .21 .21 .09 .17 .83 **3.05 1.54 1.35 1.60 2.04 1.66**

P3 .23 .20 .13 .15 .83 .77 **1.32 .82 .95 1.10 1.06**

NA1 .51 .57 .28 .27 .45 .42 .39 **3.42 3.18 3.21 2.97**

NA2 .44 .42 .17 .19 .42 .43 .39 .81 **4.47 3.78 3.67**

NA3 .38 .38 .14 .15 .51 .52 .43 .78 .80 **4.97 3.64**

NA4 .45 .41 .19 .18 .44 .46 .45 .78 .84 .79 **4.30**

*Note*: Covariances (in bold type) are displayed above and including the diagonal. Correlations are displayed below the diagonal.

SO = sleep onset, SM = sleep maintenance, P = paranoia, NA = negative affect

#### Proposed model CFA

The EFA found a very similar factor structure to original validation studies of the DASS-21 (Henry & Crawford, 2005) in that we extracted factors relating to depression, stress, and anxiety. However, Henry and Crawford specified that these three orthogonal factors together formed a fourth overarching factor – namely, negative affect. We decided to take the same approach by combining the depression, stress, and anxiety factors to represent levels of negative affect.[[4]](#footnote-4) CFA was conducted on the parcelled items constituting sleep onset, sleep maintenance, paranoia, and negative affect. Figure 7 depicts the full CFA model with standardized parameter estimates. The fit indices all indicated an acceptable model fit (CFI = .98, RMSEA = .08, SRMR = .04, CMIN/DF = 2.04), suggesting that the predicted model fitted the observed data. Inspection of the standardized residual covariances further supported the adequate fit of the model. These residuals ranged from -.80 to 1.72 with no values larger than 2.58 indicating no statistically significant discrepancies***.***

All of the observed variables had high and statistically significant (*p* < .001) loadings on the respective latent variables (see Figure 7 for the magnitude of the factor loadings). In terms of the relationships between latent variables, there were significant positive relationships between sleep onset and sleep maintenance (*r* = .65, 95% CI = .53 to .75), sleep onset and paranoia (*r* = .29, 95% CI = .13 to .42), as well as between sleep onset and negative affect (*r* = .56, 95% CI = .43 to .67). Sleep maintenance was significantly correlated with negative affect (*r* = .23, 95% CI = .08 to .36), but not with paranoia (*r* = .15, 95% CI = -.01 to .28). Finally, there was a significant correlation between negative affect and paranoia (*r* = .54, 95% CI = .37 to .69).

Figure 7

*Confirmatory Factor Analysis*

**

*Note*: e = error, SO = sleep onset, SM = sleep maintenance, NA = negative affect. P = paranoia

Rectangular boxes represent indicator variables (e.g., items from the DASS-21) that have been parcelled together to form an average (e.g., SO1 and SO2 are parcels consisting of items representing sleep onset), ovals represent latent variables while circles represent error or disturbance.

### Path analyses of a partially and fully mediated model

The final stage of the analysis used SEM based on a covariance matrix to explore the relationships between the variables examined in the preceding CFA. Figure 8 shows the relationship between insomnia and paranoid thinking either fully or partially mediated by negative affect. The fully mediated model (indicated by the solid lines in Figure 8) posits that sleep onset and sleep maintenance do not have a direct relationship with paranoia. Instead the relationship is mediated by negative affect that, in turn, has a direct relationship with paranoia. In the partially mediated model (indicated by the solid lines with the addition of two dashed lines), sleep onset and sleep maintenance have both a direct relationship with paranoia and an indirect relationship via negative affect.

The fully mediated model provided a good fit to the data (CFI = .97, RMSEA = .07, SRMR = 0.05, CMIN/DF = 2.99) and the standardized residual covariance’s contained only one value above 2.58. Sleep onset had a significant, indirect relationship with paranoia that was mediated by negative affect (*β* = .30, *p* < .001); however, the indirect relationship between sleep maintenance and paranoia via negative affect was not significant (*β* = -.03, *p* = .39). A significant association between sleep onset and negative affect (*β* = .59, *p* < .001), but not between sleep maintenance and negative affect (*β* = -.06, *p* = .40), supported the above relations. As expected, negative affect was significantly and positively related to paranoia (*β* = .51, *p* < .001).

The partially mediated model also provided a good fit to the data (CFI = .97, RMSEA = .08, SRMR = .05, CMIN/DF = 3.00) and the standardized residual covariance’s contained no values greater than 2.58. The finding that both fully and partially mediated models provided a good fit to the data is not surprising as these models have been derived from the same CFA and are nested within each other. The interesting aspect of this analysis comes from examination of the regression pathways from sleep problems (onset and maintenance) to paranoia. Neither difficulties falling to sleep (sleep onset) nor problems staying asleep (sleep maintenance) were directly associated with paranoia (*β* = .01, *p* = .95 and *β* = .01, *p* = .86 respectively). Instead, as can be seen in the fully mediated model, sleep onset problems, but not sleep maintenance problems, were indirectly associated with paranoia via negative affect. Taken together, these findings support a fully, rather than partially, mediated model of the relation between sleep problems and the experience of paranoia

Figure 8

*A Partially and Fully Mediated Model of the Relationship between Sleep Problems and Paranoia with Factor Loadings and Standardized Regression Weights*

**

*Note*: e = error, d = disturbance, SO = sleep onset, SM = sleep maintenance, NA = negative affect. P = paranoia.

Rectangular boxes represent indicator variables (e.g., survey responses) which have been parcelled together to form an average (e.g., SO1 and SO2 are parcels consisting of items representing sleep onset), ovals represent latent variables while circles represent error or disturbance. Solid lines represent a fully mediated model; while the addition of the two dashed lines form a partially mediated model

### Analysis of Objective Data on Sleep Quality

Table 11 shows the correlations between the self-report (insomnia total, sleep onset, and sleep maintenance) and objective (total sleep time, sleep latency, and the number of awakenings per night) measures of sleep quality. The correlations tended to be relatively weak (-.05 < *r* < .32), indicating a discrepancy between how participants felt that they slept and how they actually slept. Regression was used to investigate the impact of objective measures of sleep quality on paranoia and negative affect (see Table 12). Objectively measured sleep latency (the time taken to fall asleep), the average number of awakenings per night (an objective measure of sleep maintenance), and total sleep time did not predict paranoia (*β*s = -.14, -.16, and .01, respectively, *p* > .05) or negative affect (*β*s = .01, .03, and .06, respectively). These findings suggest that perceived, rather than actual, sleep problems are associated with negative affect and the experience of paranoia.

Table 11

*Correlations between Self-Report and Objective Measures of Sleep*

Measure of sleep 1 2 3 4 5 6

1. Insomnia total a 1.00
2. Sleep onset a .85\*\* 1.00
3. Sleep maintenance a .84\*\* .44\*\* 1.00
4. Total sleep timeb -.04 -.01 -.05 1.00
5. Sleep latencyb .11 .26\* -.08 .21\* 1.00
6. Awakenings per nightb .31\*\* .21\* .32\*\* -.03 .34\*\* 1.00

*Note*: \* *p* < .05, \*\* *p* < .01.

a Self-report measure of sleep assessed by the Insomnia Subscale of the Sleep-50 questionnaire (Spoormaker et al., 2005)

b Objective measure of sleep assessed by the Zeo sleep monitor.

Table 12

*Regression of Paranoia and Negative Affect on Indicators of Sleep Quality*

**Predictor *R2* *B* (SE) *β t***

*Paranoia*

Sleep latency .02 -.53 (0.04) -.14 -1.31

Awakenings .02 -.32 (0.22) -.16 -1.48

Total sleep time .01 .01 (0.01) .10 .90

*Negative affect*

Sleep latency .01 .06 (0.08) .01 .78

Awakenings .00 .13 (0.46) .03 .27

Total sleep time .00 .01 (0.02) .06 .57

## Discussion

The present research investigated two models of the relationship between insomnia, negative affect, and paranoid thoughts and also improved the way that each of the constructs was measured, relative to extant research. Specifically, we differentiated between two different facets of insomnia (sleep onset and sleep maintenance) and obtained objective measures of sleep quality from a subset of the sample. Structural equation modelling was used to simultaneously investigate the relationship between both aspects of insomnia and negative affect and paranoia. The findings suggested that problems with sleep onset (i.e., getting to sleep), but not sleep maintenance (staying asleep), were associated with paranoid thinking. However, sleep onset was not directly associated with paranoid thoughts; instead the effects were mediated by negative affect. In short, it seems likely that difficulties getting to sleep increase negative affect that, in turn, increases paranoid thinking. Having said that, these relations only held for perceived sleep quality. Objective indicators of sleep quality were not associated with negative affect or the experience of paranoia, suggesting that it is the perception of sleep quality, rather than actual sleep quality, that is associated with negative affect and paranoia.

### Insomnia is not directly related to paranoia

The present research found no evidence of a direct relationship between insomnia and the experience of paranoia; instead the relationship was mediated by negative affect. This finding compliments previous research that points to a role for negative affect in the relationship between sleep difficulties and paranoia. The link between insomnia and negative affect is well documented, with sleep problems having been shown to be concurrent with negative affect (Taylor et al., 2005) and predictive of affective symptoms (Baglioni et al., 2011). The mechanisms behind these relationships remains unclear; however, research on the interplay between insomnia and emotion (Baglioni, Spiegelhalder, Lombardo, & Riemann, 2010; Walker, 2009) provides one possible explanation. Specifically, insomnia could serve to amplify the effect of negative events. For example, Gujar, Yoo, Hu, and Walker (2011) used fMRI to investigate emotional responses to negative stimuli among participants who were sleep deprived and those who were not. Gujar et al. found an enhanced emotional reaction to negative stimuli among the sleep-deprived group when compared to controls. Zohar, Tzischinsky, Epstein, and Lavie (2005) found that sleep loss not only amplified the negative emotional consequences of disruptive daytime events but also blunted the positive benefit of rewarding or goal enhancing activities. Consequently, diminished positive emotionality and heightened negative emotionality could explain why insomnia increases negative affect. Studies that investigate the daily relations between emotion and paranoia are able to shed light on the role of emotionality in paranoia (Kramer et al., 2014; Thewissen et al., 2012). Should future studies using similar methodologies include a measure of insomnia, the interplay between insomnia, emotion and paranoia may be further understood.

In turn, it is also important to understand why negative affect is associated with paranoid thinking, given the strong relationship reported here and elsewhere (Fowler et al., 2012; Kramer et al., 2014; Lincoln, Lange, Burau, Exner, & Moritz, 2010; Lincoln, Peter, Schaefer, & Moritz, 2009; Thewissen et al., 2011; Vorontsova, Garety, & Freeman, 2013). One possibility is reasoning biases. For example, participants with higher levels of stress and anxiety have been shown to be more likely to jump to conclusions than controls (Lincoln et al., 2010; Lincoln et al., 2009) and evidence suggests that anxiety influences the processing of threat-related attentional stimuli (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van Ijzendoorn, 2007). It is possible then that negative affect invokes cognitive and attentional distortions that serve to initiate and/or maintain paranoid thoughts.

### The differing impact of onset and maintenance insomnia

Previous research on the relationship between sleep problems and paranoia has not differentiated between problems falling asleep (sleep onset) versus staying asleep (sleep maintenance). The present research found that only difficulties falling to sleep are associated with paranoid thinking (a relationship that was mediated by negative affect). Problems staying asleep were not associated with either negative affect or the experience of paranoia. These findings stand in contrast to the majority of extant research that suggests no differences in the effects of sleep onset and sleep maintenance problems on negative affect (Brabbins et al., 1993; Kim, Uchiyama, Okawa, Liu, & Ogihara, 2000; Newman, Enright, Manolio, Haponik, & Wahl, 1997; Querasalva, Orluc, Goldenberg, & Guilleminault, 1991; Riedel & Lichstein, 2000). Given these findings and that the present research is the first to examine the relation between the two types of sleep problems and paranoia, the differential impact of sleep maintenance and sleep onset problems on negative affect and paranoia observed in the present research warrants further examination before definitive conclusions are reached, especially with respect to the role of sleep maintenance problems. However, there does seem to be consistent evidence that difficulties getting to sleep are psychologically problematic.

### Objective measures of sleep quality are not associated with the experience of paranoia

The present research found no relationship between objective measures of sleep and negative affect and paranoia. On one hand, this is surprising given the strength of the relationships found with (aspects of) self-reported sleep in both the current study and in previous research. However, discrepancies between perceived and actual sleep quality are common (Akerstedt et al., 2002; Argyropoulos et al., 2003; Baker et al., 1999; Rotenberg et al., 2000; Vitiello et al., 2004). Indeed, there is a tendency for people with insomnia to overestimate sleep latency and underestimate total sleep time (for a review see Harvey & Tang, 2012) with a number of theoretical viewpoints offering an explanation for this disparity (Harvey, 2002; Ree & Harvey, 2006; Stepanski, Zorick, Roehrs, & Roth, 2000). The notion that the perception of sleep quality, rather than actual sleep quality, is associated with negative affect and paranoia has important implications, especially for the treatment of insomnia. Evidence suggests that distress over, and rumination about, getting enough sleep and the impact that poor sleep may have on health and functioning can increase arousal and emotional distress (Harvey, 2002). Interventions based on the principles of CBT often attempt to bring maladaptive thoughts (e.g. “*I must sleep at least eight hours or I will not be able to function tomorrow*”) more in line with reality (“*even if I sleep for six hours tonight, then I will still be able to function well tomorrow*”) (e.g. Lancee, van den Bout, van Straten, & Spoormaker, 2012). This cognitive restructuring can reduce the distress associated with what are often misconceptions about sleep that, in turn, might reduce negative affect and, by extension, paranoia. A more comprehensive study of CBT for insomnia, with examination of effects on paranoia is, therefore, warranted and it seems that some of this work is planned or underway (Freeman et al., 2015; Freeman et al., 2013; Myers, Startup, & Freeman, 2011).

### Limitations and future directions

The present research adopted a cross-sectional design and therefore provides limited insight into the causal nature of the relationships between sleep onset problems, negative affect, and paranoia. While the direction of the putative relations are supported by experimental studies that manipulate, for example, sleep quality (Harvey et al., 2015; Lancee et al., 2012; Myers et al., 2011) this does not preclude the presence of a bidirectional relationship whereby paranoid thinking exacerbates sleep difficulties and / or negative affect that, in turn, increases paranoid thinking. To date, only one study has attempted to investigate the direction of the relationships between insomnia, negative affect and paranoia using a longitudinal design (Freeman et al., 2012). The findings supported those of the present research to the extent that insomnia, worry, anxiety, and depression all predicted paranoid thinking. However, despite reporting illuminating and interesting findings, there were several weaknesses, including relatively limited assessment of paranoid ideation and an analysis that did not take into account the different types of insomnia. Consequently, more longitudinal research using a range of measures is needed to better capture the different facets of insomnia, negative affect, and paranoia.

Furthermore, the present chapter investigated the relationship between insomnia, negative affect, and paranoia in a community sample; therefore, caution is needed when generalising these findings to more clinically defined populations. However, evidence suggests that psychotic symptoms (van Os et al., 2000; van Os et al., 2009; Verdoux & van Os, 2002), and specifically paranoia (Freeman et al., 2005), are not only confined to clinically defined groups, but are distributed across the general population. Thus, research studying aspects of psychosis experience in non-clinical samples can inform the same experiences in clinical populations (Verdoux & van Os, 2002). By focusing on a non-clinical sample, the present research also provides an insight into how the link between sleep difficulties and paranoia may evolve at earlier stages, and points to targets for early intervention.

The present research provides further evidence of the role of negative affect, not only in the experience of paranoia, but also in the relationship between sleep difficulties and paranoia. Therefore, one target for interventions could be to help people to identify and use effective strategies for regulating their emotions. The need for more adaptive regulation of negative emotions among people who experience paranoia is apparent, with persecutory ideation associated with difficulties regulating emotion (Westermann, Boden, Gross, & Lincoln, 2013; Westermann, Kesting, & Lincoln, 2012; Westermann & Lincoln, 2011; Westermann, Rief, & Lincoln, 2014). Furthermore, inadequate sleep is not only associated with a decreased ability to regulate emotion (Baum et al., 2014; Gruber & Cassoff, 2014; Mauss, Troy, & LeBourgeois, 2013), but can also interfere with a wide range of executive functions that may be important to the effective regulation of emotion (Alhola & Polo-Kantola, 2007; Durmer & Dinges, 2005; Harrison & Horne, 1998; Horne, 1988; Killgore, Balkin, & Wesensten, 2006; Linde & Bergstrom, 1992; Nilsson et al., 2005; Wimmer, Hoffmann, Bonato, & Moffitt, 1992). Consequently, the problems with emotion regulation often seen in those with heightened persecutory thinking may be exacerbated when sleep is disturbed. Certain strategies for regulating emotions (e.g., reappraisal) have been shown to be effective both in shaping emotional experiences (Webb, Miles, & Sheeran, 2012) and reducing psychopathology (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Therefore, interventions that combine strategies for dealing with insomnia alongside strategies for improving emotion regulation may be particularly successful in reducing paranoia.

### Conclusion

The present research found that difficulties falling to sleep, but not difficulties staying asleep, are associated with negative affect that, in turn, is associated with paranoia. However, these relationships did not hold for objective measures of sleep quality, suggesting that it is the perception of poor sleep, rather than actual poor sleep, that is associated with negative affect and paranoia. The findings presented here point to a number of potential strategies for interventions designed to reduce paranoia. For example, interventions may profitably target (i) perceived sleep quality, (ii) sleep onset problems, and / or (iii) emotion regulation as a route to reducing negative affect and, thus, paranoid thinking. Chapter 5 aims to develop the research presented in Chapter 4 by assessing the impact of a CBT based self-help intervention for insomnia on levels of negative affect and paranoid thinking.

# The effect of an online self-help cognitive behavioural intervention for insomnia on paranoia and negative affect: A randomised controlled trial

## Introduction

In the previous chapter, the association between insomnia, negative affect and paranoia was explored. Extant literature has suggested that insomnia is both directly associated with paranoia, and indirectly associated through negative affect (Freeman et al., 2010; Freeman et al., 2009; Freeman et al., 2012). Chapter 4 developed this research further by improving on the measurement of insomnia, paranoia and negative affect relevant to extant literature and using structural equation modelling to clarify the mediatory role of negative affect. Both previous research and the work presented in Chapter 4 combine to provide strong evidence of an association between insomnia and paranoid thoughts mediated by negative affect. This association raises an intriguing possibility that the present chapter aims to explore; can interventions for insomnia lead to improvements in negative affect and paranoia?

Interventions designed to reduce insomnia may reduce paranoia because (i) the experience of insomnia is linked to negative affect and (ii) negative affect is associated with paranoia. The association between the experience of insomnia and negative affect is well documented. For example, Taylor, Lichstein, Durrence, Reidel, and Bush (2005) reported that participants with insomnia were 9.82 and 17.35 times more likely to have clinically meaningful depression and anxiety respectively than participants without insomnia. A meta-analysis of 21 longitudinal studies of insomnia and depression revealed a two-fold risk of developing depression among people with insomnia (Baglioni et al., 2011). Negative affect, in turn, seems to be related to paranoia. For example, Kramer et al. (2014) used experience sampling to examine the moment-to-moment interplay between negative affect and paranoia experience, reporting that increases in negative affect were met by increases in paranoia (see also Thewissen et al., 2011). Lincoln, Peter, Schaefer, and Moritz (2009) induced state anxiety in a group of participants and compared their performance on a measure of ‘jumping to conclusions’ (namely, the beads task, Huq, Garety, & Hemsley, 1988), to a no anxiety control group. Lincoln et al. found that the anxiety group reported significantly more paranoid thoughts and showed more pronounced jumping to conclusion biases than the control group. A similar effect was found when stress was used as the independent variable (Lincoln et al., 2010). In short, negative affect is strongly related to the experience of paranoia (see also Fowler et al., 2012; Vorontsova et al., 2013).

To our knowledge, only one study to date has investigated the effects of an intervention designed to reduce insomnia on the experience of paranoia, and no study has used a self-help approach. Myers, Startup, and Freeman (2011) investigated the efficacy of a four-session cognitive behavioural therapy intervention aimed at reducing levels of insomnia (CBTi) in those experiencing persistent persecutory delusions. Large reductions in the levels of reported insomnia were seen at both post-treatment and follow up points. This reduction in insomnia was associated with a significant reduction of persecutory delusions at both post-treatment and follow points in addition to improvements in anxiety and depression. It should however be noted that this study does suffer from several methodological limitations; namely the absence of a control group, the use of a repeated measures design and the use of unblinded assessments. Nonetheless, the authors reported the first incidence of established interventions for sleep disturbances reducing levels of paranoia with more comprehensive trials in the pipeline (Freeman et al., 2015; Freeman et al., 2013).

As outlined earlier, negative affect plays an important and central role in the relationship between insomnia and paranoia experience. Consequently support for using insomnia interventions to address paranoia would be strengthened should these interventions ameliorate negative affect. This is certainly a growing area; with many researchers reporting the positive effect insomnia interventions can have on not only sleep measures, but also negative affect. For example, Lancee, van den Bout, van Straten, and Spoormaker (2012) found that a self-help CBTi intervention not only significantly reduced the severity of insomnia but also reduced anxiety and depression (compared to a wait-list control group). Furthermore, Manber et al. (2008) randomised participants with depression to receive either a 7-session CBTi intervention in addition to medication or medication only. The authors reported higher rates of remission in the intervention group on measures of insomnia (50% vs. 7.7%) and depression (66% vs. 33%) (see also Wagley, Rybarczyk, Nay, Danish, & Lund, 2013; Watanabe et al., 2011). Interventions designed to target insomnia therefore have beneficial consequences for levels of negative affect, benefits that may extend to paranoia experience given the close relationship between negative affect and the formation and maintenance of paranoid thoughts.

The majority of studies examining the effects of interventions designed to reduce insomnia on mental health outcomes have focussed on face-to-face CBT (although, see Lancee et al., 2012, for a notable exception). This traditional approach to psychotherapy has many benefits including increased therapist contact and a greater control over the therapeutic process; however, there are limitations. For example, face-to-face CBT is time consuming (Aschim, Lundevall, Martinsen, & Frich, 2011; Wiebe & Greiver, 2005), is often offered at great cost and, thus, has limited availability (Cavanagh, 2014; Shapiro, Cavanagh, & Lomas, 2003). Given that service providers do not have the luxury of abundant time and finances, self-help can provide a viable alternative to face-to-face interventions. Self-help interventions have been shown to be effective in treating insomnia (Ho et al., 2015; van Straten & Cuijpers, 2009), psychosis experience (Scott, Webb, & Rowse, 2015) and common mental health problems such as depression and anxiety (Cuijpers, Donker, et al., 2010; Gellatly et al., 2007). However, no study to date has examined the effect of a self-help intervention for insomnia on levels of negative affect and paranoia. Given (i) the links between insomnia and negative affect (ii) between negative affect and paranoia, and (iii) the beneficial effects of self-help interventions on these constructs to date, it seems likely that self-help interventions targeting these outcomes could offer a cost-effective, highly accessible tool for reducing paranoid thinking.

### The Present Research

The present research aimed to provide the first randomised controlled trial testing the impact of a self-help CBTi intervention designed to reduce insomnia on levels of negative affect and paranoia experience. The effects of the intervention will be compared against two control conditions; an active control group (who are simply asked to complete sleep diaries) and a wait-list control group. It is predicted that those allocated to the intervention condition will report reduced levels of insomnia, negative affect, and paranoia when compared to the sleep diary and wait-list conditions. Furthermore, should these predictions be supported by the present chapter, the causal role of insomnia in the experience of negative affect and paranoia will be clearer. That is, should manipulating insomnia lead to changes in affective and paranoid experiences, then the case for the causal influence of insomnia is strengthened. This is in line with an interventionist causal model, whereby clinical interventions can “show how causal variables of different types can figure in a single rigorous account of the causation of psychiatric illness” (Kendler & Campbell, 2009. p. 881).

## Method

### Participants

G-Power v3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) was used to determine the number of participants needed to detect a statistically significant difference in insomnia measures based on the effect size reported by a similar intervention (Lancee et al., 2012). Power analysis based on an effect size of *d* = .79, 80% power and a significance level of *p* < .05 suggested that at least 36 participants would be needed in each group (total *N* = 108)[[5]](#footnote-5). A total of 330 participants (77% female) were recruited from a general population sample via volunteer email lists. The majority of these participants were aged between 18 and 24 (50%) followed by 25 to 34 years (18%), 35 to 44 years (13%), 45 to 54 years (12%) and finally 55 to 64+ years (7%). Participants were randomised to one of three conditions; the online intervention group (*N* = 94), a sleep diary control group (*N* = 100) and a wait-list control group (*N* = 136). Figure 9 shows the flow of participants through the study.

Figure 9

*Participants Flow Chart Showing the Number of Participants Who Were Randomly Assigned, Received the Intended Treatment and Were Analysed for the Primary Outcomes*

Randomised to groups

*N* = 330

Sleep diary group

*N* = 100

Wait-list control group

*N* = 136

Intervention group

*N* = 94

Started online questionnaires

*N* = 457

Did not complete baseline measures

*N* = 127

Post intervention

*N* = 21

Post intervention

*N* = 46

Post intervention

*N* = 94

4-week follow-up

*N* = 18

4-week follow-up

*N* = 71

4-week follow-up

*N* = 35

18-week follow-up

*N* = 18

18-week follow-up

*N* = 59

18-week follow-up

*N* = 29

### Design

The current study used a randomised controlled trial design. Participants were randomised to one of three conditions; a wait-list control group, an active control group who completed a daily sleep diary only and an experimental group who received an online self-help intervention, in addition to completing a daily sleep diary. Measures of insomnia, negative affect and paranoia were taken at baseline and post-intervention, as well as 4 and 18 weeks after completion of the 6-week intervention. Ethical approval was granted by The Department of Psychology Research Ethics Committee at the University of Sheffield.

### Procedure

 Potential participants were emailed with an invitation to take part in a research project described as helping people to get better night’s sleep. Interested participants were asked to visit the intervention website to register their interest and complete the baseline measures. Participants were then randomly allocated to one of the three groups using a random generator. Participants were then presented with a screen detailing information relevant to the specific group that they had been assigned to. For the intervention group this information contained instructions on how to navigate the website as well as an overview of the intervention itself and what was expected of them. Participants assigned to the sleep diary group were given information on how to complete the online sleep diary as well as what they were expected to do throughout the study. Participants in the wait-list control were told that they would be offered the intervention after they had completed the final follow-up measure (they were not explicitly told they were in a control or wait-list condition). Participants then followed the instructions presented by the online intervention for 6 weeks before completing post-intervention measures along with 4- and 18-week follow-up measures. After the last follow-up measure was completed, participants were sent an email explaining the aims of the research and a full debrief was provided.

### The Sleep Healthy intervention

An online self-help intervention (similar to Sleepio, see Espie et al., 2012) designed to target elements that contribute to the formation and maintenance of insomnia symptoms was adapted from that developed by Lancee et al. (2012) (full permissions were obtained in order to use the Sleep Healthy content, see Figure 10 for an overview of the intervention). The intervention was administered entirely independently of contact with the researchers and provided psychoeducational materials detailing good sleep hygiene practices and information about sleep as well as exercises aimed at challenging common misconceptions and maladaptive thought processes about sleep. For example one of the exercises asks participants to write down (using an online form built into the website) the details of the last time they laid in bed struggling to fall to sleep. They were encouraged to break this experience down into constituent thoughts, feelings and behaviours as well as identify adaptive and beneficial steps they could take if a similar situation occurs again**.** The sleep diary (which was completed by both the intervention and sleep diary only group) consisted of 11 items regarding bed and rise times, number of awakenings per night, morning feel (on a 5-point scale) and caffeine consumption. Participants were instructed to complete the sleep diary daily and could track their progress via the ‘Sleep Stats’ section of the website (e.g. they could track the times they went to bed and how refreshed they felt in the morning). The Sleep Healthy intervention was informed by the findings of Chapter 3, namely that complex, multifaceted interventions were associated with larger effect sizes. As such, Sleep Healthy comprises multiple techniques and strategies designed to improve sleep quality.

 Figure 10

*A Weekly Overview of the Sleep Healthy Intervention adapted from Lancee et al. (2012)*

Week 1 *Diary*: The daily sleep diary allowed participants to record the time they went to bed, how easy to was to fall to sleep, total sleep time, number of awakenings, rise time and how refreshed they felt in the morning).

 *Psychoeducation*: information on sleep, sleep problems and sleep hygiene is provided.

Week 2 *Diary*.

*Stimulus control/sleep hygiene*: The goal of this module is to re-associate the bed with sleeping. Participants are instructed to go to bed only when sleepy, use the bed and bedroom for sleep only, maintain a regular rising time, avoid daytime naps, and move out of bed and into another room when unable to fall asleep.

*Progressive muscle relaxation.*

Week 3  *Diary.*

*Sleep restriction*: *P*articipants use their online diaries to estimate their total sleeping time, their time in bed, and sleep efficiency. The restriction of sleep is achieved by either going to bed later or getting out of bed earlier (participants’ choice).

*Imaginative relaxation exercise*.

Week 4 *Diary.*

 *Sleep restriction.*

*Challenging misconceptions*: Common negative thoughts and feelings about insomnia are addressed.

Week 5 *Diary*

 *Sleep restriction*

 *Cognitive restructuring*

Week 6 *Diary*

*Paradoxical intention*: At the end of treatment, participants sleep fewer hours than normal for one night (with a minimum of 5 h), so as to learn that partial sleep deprivation does not necessarily impair daily functioning.

The Sleep Healthy website was predominantlywritten in PHP, a server-side programming language that allowed for the development of the key interactive features of the website. The website was fully functional for both laptops and personal computers as well as for tablet and mobile devices. Upon first login, participants were presented with an introductory homepage with a navigation panel to the left of the screen showing an overview of each week of the intervention. Participants started at week one, with subsequent weeks of the intervention being unlocked following completion of the previous weeks activities. Participants could track their progress through the intervention using a progress bar that filled as each module was completed. Participants could also access the results of their sleep diaries (sleep efficiency, average bed and rise times etc.) by clicking on a “Sleep Stats” link at the top of each web page. The website was also able to send automated email reminders to participants who had not engaged with the website for a week as well as those who had not completed sleep diary entries or the follow-up questionnaires.

### Measures

In order to facilitate greater comparability between studies in the present thesis, the same measures of paranoia, negative affect and insomnia were employed throughout (see section 4.2.3 for more details). Paranoia was measured using part B of the Green Paranoid Thoughts Scale GPTS (Green et al., 2008). Participants are asked to indicate the extent to which they agree or disagree with sixteen statements over the previous month, including “Certain individuals have had it in for me” and “It was diﬃcult to stop thinking about people wanting to make me feel bad” on a 5-point scale. Scores range from 16 to 80, with higher scores indicating higher levels of persecutory beliefs.

The shortened form of the Depression, Anxiety, and Stress Scale (DASS-21; Henry & Crawford, 2005) was used to measure levels of negative affect. Participants were asked to identify (on a 4-point scale) the extent they agree with items such as “I couldn’t seem to experience any positive feeling at all” and “I felt scared without any good reason”. Participants were asked to consider their responses in light of the previous week, with higher scores indicating higher levels of negative affect.

The 8 item insomnia subscale of the Sleep-50 questionnaire (Spoormaker et al., 2005) was used to measure both sleep onset and sleep maintenance insomnia (derived from the EFA analysis presented in section 4.3.1.2). Participants were asked to rate the extent during the last 4 weeks to which they agree with items such as “I worry so much it prevents me from falling asleep” and “I wake up during the night” on a 4 point scale.

### Approach to data analysis

A repeated measures MANOVA including all outcome variables (total insomnia, sleep onset and sleep maintenance, negative affect and paranoia) was first conducted to examine the main effects of time and group as well as any significant time x group interactions. However, repeated measures MANOVA will only include participants who have provided data for each follow-up point, consequently the analysis *N* could be significantly reduced due to participant attrition leading to reduced statistical power. Consequently, independent measures MANOVA will also be conducted at each follow-up point separately (post-intervention and the 4-week and 18-week follow-up points) along with an effect size analysis which is largely independent of sample size.

## Results

### Randomisation check

MANOVA revealed no significant differences at baseline between groups in terms of insomnia, negative affect and paranoia, (*F*(3, 326) = .79, *p* = .50). Baseline differences for nominal variables (age and gender) were assessed using Chi square, with no significant differences between groups reported for age, *X*2(8) = 3.56, *p* = .90, and gender, *X*2(2) = 5.62, *p* = .06. Consequently the randomisation process was successful. Baseline scores on the outcomes used are presented in Table 12.

Table 13

*Levels of Insomnia, Total Negative Affect, and paranoia*

 **Baseline Post-intervention 4-week follow-up 18-week follow-up**

Outcome Group *N M SD N M SD N M SD N M SD*

*Total insomnia* Intervention 94 20.93 4.63 21 16.29 4.81 18 16.67 4.70 18 19.33 4.61

 Sleep diary 100 21.23 4.08 46 19.04 3.84 35 18.94 3.34 29 19.17 4.33

 Wait-list 136 20.98 4.55 94 20.11 5.14 71 18.82 5.51 59 18.52 5.89

*Onset* Intervention 94 10.89 2.86 21 7.81 2.54 18 8.56 2.62 18 9.56 2.55

 Sleep diary 100 11.14 2.38 46 9.46 2.20 35 9.20 2.26 29 9.38 2.21

 Wait-list 136 10.87 2.79 94 10.27 3.19 71 9.73 3.22 59 9.12 2.94

*Maintenance* Intervention 94 10.03 2.95 21 8.48 3.27 18 8.11 2.97 18 9.78 2.96

Sleep diary 100 10.09 2.93 46 9.59 3.20 35 9.74 2.84 29 9.79 2.21

 Wait-list 136 10.11 2.86 94 9.85 3.00 71 9.08 3.15 59 9.41 3.73

*Negative affect* Intervention 94 18.97 11.45 21 11.05 6.13 18 10.22 10.12 18 12.50 8.41

 Sleep diary 100 17.93 11.08 46 15.46 11.93 35 13.09 9.95 29 13.83 8.76

 Control 136 18.88 11.97 94 18.57 13.02 71 16.99 13.49 59 14.39 12.09

*Paranoia* Intervention 94 22.63 11.08 21 17.76 5.52 18 17.89 4.54 18 20.83 9.90

 Sleep diary 100 22.08 8.75 46 21.37 8.40 35 19.46 4.74 29 21.10 9.75

 Control 136 22.94 10.66 94 23.85 11.80 71 22.99 11.60 59 21.39 10.35

### Two-way repeated measures MANOVA

 A two-way repeated measures MANOVA was used to examine the effect of the self-help intervention on insomnia (as well as onset and maintenance separately), negative affect and paranoia in terms of both between group factors (group allocation) and within-group factors (time). Results revealed that although there was a significant main effect of time on all outcomes, (*F* (12, 51) = 4.66, *p* < .001), there was not a significant main effect of group, (*F* (8, 120) = .44, *p* = .90), or a time x group interaction, (*F* (24, 104) = .69, *p* = .85). Post-hoc pairwise analysis conducted on the significant main effect of time revealed that there was a significant improvement in insomnia (as well as onset and maintenance separately), negative affect and paranoia from baseline to post-intervention regardless of group allocation (*p* < .001) There were no other significant differences between time points for any outcome measure (e.g. between post-intervention and the 4-week and 18-week follow-up points).

The results of the repeated measures MANOVA suggest that all participants, irrespective of group allocation, improved over time. However it is important to note that repeated measures MANOVA includes only participants who have provided data for all outcomes and each time-point. This can be problematic if, as was the case in the present study, there is a high level of participant attrition (explored in more detail in section 5.3.5). For example the MANOVA analysis presented here consisted of only 8 participants in the intervention group, 19 in the sleep diary group and 38 in the wait-list control group. This low sample size can lead to a lack of statistical power (indeed the analysis *N* fell well below the required sample size calculated by the power analysis in section 5.2.1). Consequently, one-way independent measures MANOVA was used to examine the effects of the intervention separately at each time point (post-intervention, 4-weeks and 18-week separately). This will allow the effect of the intervention to be investigated with more participants. Following this, an effect size analysis is presented which is largely independent of sample size.

### One-way independent measures MANOVA

Multivariate tests revealed that there were significant differences between groups at post-intervention, (*F*(4, 156) = 4.15, *p* = .003), but not at the 4-week follow-up point, (*F*(4, 119) = 1.90, *p* = .12) , or the 18-week follow-up point, (*F*(4, 101) = .61, *p* = .66). Post-hoc, pair-wise comparisons were conducted on any time point with significant differences between the groups (in this case at post-intervention only). These comparisons revealed that the intervention group, (*M* = 16.29, *SD* = 4.81), reported significantly lower total insomnia at post-intervention than the wait-list control group, (*M* = 20.12, *SD* = 5.14, *p* = .003), but not the sleep diary group, (*M* = 19.04, *SD* = 4.81, *p* = .09). There was no significant difference in the severity of total insomnia at post-intervention between the sleep diary group and the wait-list control group, (*p* = .86).

Further post-hoc comparisons revealed that the intervention group (*M* = 7.81, *SD* = 2.54) reported significantly fewer problems getting to sleep (sleep onset) than the wait-list control group, (*M* = 10.21, *SD* = 3.19, *p* < .001), but not the sleep diary group, (*M* = 9.46, *SD* = 2.20, *p* = .09). Again, there was no significant difference in sleep onset between the sleep diary group and the control group at post-intervention, (*p* = .35). In terms of problems staying asleep (sleep maintenance), there was no significant difference between the intervention group, (*M* = 8.48, *SD* = 3.27), and the wait-list control group, (*M* = 9.85, *SD* = 3.00, *p* = .75), or the sleep diary group, (*M* = 9.59, *SD* = 3.20, *p* = .82). Similarly, there was no significant difference in sleep maintenance at post-intervention between the sleep diary group and the wait-list control group, (*p* = .56). These results would suggest, at least at post-intervention, that the significant difference found in terms of total insomnia when the intervention group was compared to the wait-list control group was driven by reductions in sleep onset rather than sleep maintenance.

 Attention now turns to negative affect, with participants in the intervention group, (*M* = 11.05, *SD* = 6.13), reporting significantly lower negative affect than those allocated to the wait-list control group, (*M* = 18.57, *SD* = 13.02, *p* = .03), but not when compared to the sleep diary group, (*M* = 15.46, *SD* = 11.93, *p* = .50). There was no significant difference between the sleep diary group and the wait-list control group on negative affect at post-intervention, (*p* = .46). Finally, post-hoc comparisons revealed that the intervention group, (*M* = 17.76, *SD* = 5.52), reported significantly lower paranoia scores at post-interventions than the wait-list control group, (*M* = 23.85, *SD* = 11.80, *p* = .04), but not the sleep diary group, (*M* = 21.37, *SD* = 8.40, *p* = .56). There was no significant difference in paranoia scores at post-intervention between the sleep diary group and the wait-list control, (*p* = .55). In summary, there were significant differences between the groups on measures of total insomnia severity, sleep onset (but not sleep maintenance), negative affect and paranoia. However these differences were evident at post-intervention only and tended to be present when the intervention group was compared to the wait-list control group only.

### Effect size analysis

A between group effect size analysis was conducted for each time point to explore the efficacy of the intervention on insomnia, negative affect and paranoia. The effect sizes presented here can be seen in Table 13 and are reported separately for each outcome.

 Table 14

*Effect Sizes Estimates and 95% Confidence Intervals for All Comparisons Throughout the Study*

 **Post-intervention 4-week follow-up 18-week follow-up**

Outcome Comparison Cohen’s *d* 95% CI Cohen’s *d* 95% CI Cohen’s *d* 95% CI

*Total insomnia* Intervention vs. wait-list control .75 .23 to 1.26 .40 -.12 to .92 -.14 -.67 to .39

 Intervention vs. sleep diary .67 .11 to 1.22 .59 .00 to 1.16 -.04 -.62 to .55

 Sleep diary vs. wait-list control .23 -.13 to .58 -.02 -.43 to .38 -.12 -.56 to .33

*Sleep onset* Intervention vs. wait-list control .80 .31 to 1.28 .40 -.12 to .92 -.15 -.68 to .38

 Intervention vs. sleep diary .71 .18 to 1.24 .59 .00 to 1.16 -.04 -.62 to .55

 Sleep diary vs. wait-list control .64 .28 to 1.00 .18 -.23 to .58 -.10 -.54 to .35

*Sleep maintenance* Intervention vs. wait-list control .45 -.03 to .92 .31 -.21 to .83 -.10 -.63 to .43

 Intervention vs. sleep diary .34 -.18 to .86 .57 -.02 to 1.13 .00 -.58 to .59

 Sleep diary vs. wait-list control .23 -.13 to .58 -.22 -.62 to .19 -.11 -.56 to .33

*Negative affect* Intervention vs. wait-list control .62 .14 to 1.10 .52 .00 to 1.04 .17 -.36 to .69

 Intervention vs. sleep diary .42 -.11 to .94 .29 -.29 to .85 .15 -.44 to .74

 Sleep diary vs. wait-list control .25 -.11 to .60 .31 -.10 to .72 .05 -.39 to .49

*Paranoia* Intervention vs. wait-list control .56 .07 to 1.03 .48 -.04 to 1.00 .05 -.47 to .58

 Intervention vs. sleep diary .47 -.05 to .99 .34 -.24 to .90 .03 -.56 to .62

 Sleep diary vs. wait-list control .23 -.13 to .58 .36 -.05 to .76 .03 -.42 to .47

#### Effects on insomnia

At post-intervention, there was a large sized effect of the self-help intervention on total insomnia scores when the intervention group was compared to the wait-list control, (*d* = .75, 95% CI = .23 to 1.26), and a medium-to-large sized effect when compared to the sleep diary group, (*d* = .67, 95% CI = .11 to 1.22). There was a small effect of the sleep diary when compared to the wait-list control, (*d* = .23, 95% CI = -.13 to .58). At the 4-week follow-up point, a small-to-medium sized effect of the intervention was evident when the intervention group was compared to the wait-list control group, (*d* = .40, 95% CI = -.12 to .92), and a medium sized effect when compared to the sleep diary group, (*d* = .59, 95% CI = .00 to 1.16). When the sleep diary group was compared to the wait-list control group, no effect on total insomnia scores was evident, (*d* = -.02, 95% CI = -.43 to .38). Overall, these effect sizes suggest that the online self-help intervention (Sleep Healthy) had medium-to-large effects on total insomnia severity at post-intervention when compared to the sleep diary group and the wait-list control group. These effects, although lower, largely held at the 4 week follow-up point before almost no effect was evident at the 18-week follow-up point.

#### Effects on negative affect

A medium-to-large effect was evident at post-intervention when the intervention group was compared with the wait-list control group, (*d* = .62, 95% CI = .14 to 1.10), and a small-to-medium effect when compared to the sleep diary group, (*d* = .42, 95% CI = -.11 to .94). There was a small effect of using a sleep diary when the sleep diary group were compared to the wait-list control group at post intervention, (*d* = .25, 95% CI = -.11 to .60). At the 4-week follow-up point, a medium sized effect on negative affect was found when the intervention group was compared to the wait-list control group, (*d* = .52, 95% CI = .00 to 1.04), and a small effect when compared to the sleep diary group, (*d* = .29, 95% CI = -.29 to .85). There was a small effect when the sleep diary group were compared to the wait-list control, (*d* = .31, 95% CI = -.10 to .72). Finally, at 18-weeks, there was almost no effect across all comparisons with effect sizes ranging from, *d* = .05 to .17.

#### Effects on paranoia

At post-intervention, there was a medium sized effect of the self-help intervention on paranoia when compared to the wait-list control group, (*d* = .56, 95% CI = .07 to 1.03), and the sleep diary group, (*d* = .47, 95% CI = -.05 to .99). When the sleep diary group was compared to the wait-list control group, a small effect was evident, (*d* = .23, 95% CI = -.13 to .58). At the 4-week follow-up point, a medium sized effect of the intervention was still evident when the intervention group was compared to the wait-list group, (*d* = .48, 95% CI = -.04 to 1.00), and a small sized effect when compared to the sleep diary group, (*d* = .34, 95% CI = -.25 to .90). There was a small effect of using a sleep diary when compared to the wait-list control group at 4-weeks, (*d* = .36, 95% CI = -.05 to .76). At 18-weeks, much like negative affect, there was almost no effect of the intervention or sleep diary on paranoia scores with effect sizes ranging from *d* = .03 to .05.

### Attrition

The attrition rate in the present study was relatively high, especially in the intervention group with the most pronounced drop-out evident from baseline to post-intervention (see Figure 9). Consequently it is important to investigate possible reasons to explain the drop-out rate. Of the 457 participants that began the initial online questionnaires, 127 (28%) dropped out and so were not randomised to a group. Of the 330 participants who completed the baseline measures, 94 (28%) were randomised to the intervention group, 100 (31%) to the sleep diary group and 136 (41%) to the wait-list control group. In the intervention group, 73 (78%) participants dropped out of the study at post-intervention while 54 people (54%) in the sleep diary group and 42 (31%) from the wait-list control group dropped out at post-intervention. Given that the largest attrition rate occurred at post-intervention, MANOVA was conducted in order to determine whether baseline scores on measures of insomnia, negative affect and paranoia were a significant determinant of participant drop-out. MANOVA revealed no significant differences between those who stayed in the study, and those who dropped out on measures of insomnia, total negative affect and paranoia (*F*(3, 326) = .98, *p* = .40). Nominal variables (age and gender) were assessed using Chi square, with no significant differences between those who stayed in the study and those who dropped out on gender (*X*2(1) = .60, *p* = .80). However there was a significant association between age and drop-out (*X*2(4) = 13.76, *p* = .008). The rate of attrition was highest in younger age groups, with drop-out rates decreasing as participants got older. Amongst the 18-24 year old age group, 54% dropped out at post intervention with 24% of the 25-34 year olds, 11% of the 35-44 year olds, 7% of the 45-54 year olds and only 5% of those aged 55-65.

## Discussion

Chapter 5 presents two firsts; (i) the first randomised controlled trial of the effects of an intervention targeting insomnia on levels of paranoid thinking; and (ii) the first study to do this using a self-help intervention. The key finding was that a self-help intervention for insomnia can have a beneficial impact on the quality of sleep, affective symptoms and the experience of paranoia, at least immediately post-intervention. This finding is consistent with a growing body of research suggesting that improvements in insomnia are accompanied by reductions in negative affect (Manber, et al., 2008; Watanabe et al., 2011; Lancee et al., 2012; Wagley et al., 2012) and the experience of paranoia (Myers et al., 2011).

However, the effects of the intervention were not statistically significant at the 4-week and 18-week follow-up points. This is most likely due to participant drop-out (leading to a lack of power) with 78% (*N* = 73) of the intervention group, 54% (*N* = 54) of the sleep diary group and 31% (*N* = 42) of the wait-list control group dropping out of the study at post-intervention. Therefore Cohen’s effect size *d* was reported at each follow-up point in order to investigate the effect on the intervention relatively independently of sample size. These effect sizes revealed medium-to-large improvement in the intervention group on measures of insomnia, negative affect and paranoia when compared to the wait-list control group and small-to-medium effects when compared to the sleep-diary group at post-intervention. The beneficial effect of the intervention on insomnia, negative affect and paranoia was still evident at the 4-week follow-up point when compared to the wait-list control group and the sleep diary group, albeit a slightly smaller magnitude. At 18 weeks however, the intervention had little effect on insomnia, negative affect and paranoia when compared to the sleep diary group and the wait-list control group. The effect sizes reported suggest that any non-significant MANOVA results (with the exception of the 18-week follow-up where) may be due to a lack of statistical power (due to the high attrition rate) rather than a lack of difference between the study conditions.

### Theoretical implications

The current study used an interventionist causal model (Kendler & Campbell, 2009) to shed light on the potentially causal impact that insomnia exerts on both negative affect and paranoid thinking. Insomnia was successfully manipulated, which was accompanied by alterations in affective experiences and paranoia. This finding, in combination with previous research, suggests that increases in insomnia can exacerbate negative affect and paranoia. Insomnia has in the past been seen as a secondary consequence of other problems (e.g., depression, anxiety, and stress); however more contemporary views prescribe a more influential role for insomnia. Chronic insomnia for example can exist months, even years before the first depressive episode (Franzen & Buysse, 2008), which has led to suggestions that ‘co-morbid insomnia’, rather than ‘secondary insomnia’ may be a more appropriate term (Health, 2005; Lichstein, 2006; McCrae & Lichstein, 2001). Insomnia is not only concurrent with negative affect (Taylor et al., 2005); it is also predictive of affective experiences (Baglioni et al., 2011). Moreover negative affect has been shown to play a central, mediating role in the link between insomnia and paranoid thinking (Freeman et al., 2010; Freeman et al., 2009; Freeman et al., 2012). Consequently two likely, but not exclusive, explanations may account for the relationship between insomnia, negative affect and paranoia; a fully, and/or a partially mediated model, both of which require further investigation.

### Limitations and future directions

 One limitation of the current study is the relatively high attrition rate, particularly in the intervention condition. Although we found effect sizes which support the efficacy of self-help CBTi on affective symptoms and paranoia experience (with the exception of the 18-week follow-up), many participants felt they did not want to continue with the intervention and dropped out. A more detailed analysis of the attrition rate revealed that gender, along with baseline levels of insomnia, negative affect and paranoia did not influence the attrition rate. However the age of participants was significantly associated with participant drop out, with younger age groups more likely to drop out. This is a finding that stands in contrast to extant literature. For example, Christensen et al. (2009) conducted a systematic review of adherence to internet based self-help interventions for depression and anxiety, concluding that younger age groups were more likely to adhere to an intervention than older age groups (see also Melville, Casey, & Kavanagh, 2010). Consequently, the finding that younger participants were more likely to drop out warrants further attention in future trials. This attrition rate contributed to a further limitation, that Chapter 5 was unable to use the multiple follow-up points to test the mediatory effect of negative affect due to statistical non-significance. Given the full mediation reported in Chapter 4, the mediatory effect of negative affect on paranoia would have been interesting given the longitudinal nature of the data presented in the present chapter.

Adherence to self-help interventions generally can often be poor (Christensen, Griffiths, & Jorm, 2004; Christensen, Griffiths, Korten, Brittliffe, & Groves, 2004; Etter, 2005; Farvolden, Denisoff, Selby, Bagby, & Rudy, 2005; Wu, Delgado, Costigan, Maciver, & Ross, 2005). However, Eysenbach (2005) argues that eHealth interventions (interventions delivered electronically) suffer from a particular tendency for participants to drop out. The solution to this problem may be derived from three possible research routes; (i) refining self-help interventions so that more people feel they can engage with them. The rate of adoption and subsequent engagement with self-help interventions will depend on the relative advantage the intervention offers, the complexity, the compatibility with existing values and needs of the adopter, as well as the perceived efficacy (Eysenbach, 2005). (ii) Understanding the characteristics of those who respond well to self-help and those who do not. For example, Melville et al., (2010) conducted a systematic review of drop out from internet based self-help for a range of psychological complaints. Melville et al. identified three categories associated with dropout; sociodemographic variables (age, gender etc.), psychological problems (duration of psychological difficulties, comorbidity etc.) and intervention related variables (intervention credibility, computer literacy etc.). Further exploration of these factors in future trials may elucidate the reasons why some people adhere to online interventions better than others. Finally (iii), developing adjunctive strategies to aid engagement and uptake.

One such adjunctive strategy which offers potential is the formation of if-then plans, otherwise known as ‘implementation intentions’ (Gollwitzer & Sheeran, 2006). If-then plans “link suitable opportunities to act (specified in the *if* part of the plan) with instrumental responses to those opportunities (specified in the *then* part of the plan)” (Varley, Webb, & Sheeran, 2011, p. 123). For example, a person using self-help CBTi may explicitly link a distressing aspect of insomnia such as feeling anxious about not being able to sleep with a relaxation exercise offered by the self-help intervention; ‘*if* I feel anxious about falling to sleep, *then* I will use the progressive muscle relaxation technique’. Implementation intentions have been down to be an effective way of achieving intended goals (for a meta-analysis see Gollwitzer & Sheeran, 2006) and to be a valuable supplement to aid engagement with self-help interventions (Shah, Hunt, Webb, & Thompson, 2014; Varley et al., 2011).

 Future research may wish to consider two factors that the current study did not address; (i) the moderating effect of baseline vulnerability; and (ii) the impact of sleep disturbances on reasoning biases. The idea of a vulnerability to psychosis moderating the impact of emotion on paranoia experience is consistent with the threat anticipation model of persecutory delusions (Freeman, Garety, Kuipers, Fowler, & Bebbington, 2002). Lincoln et al. assessed baseline vulnerability to psychosis, reporting that participants with higher baseline vulnerability were more likely to show an increase in paranoid thoughts in response to increased stress (2009) and anxiety (2010). Future research may wish to consider employing a measure of baseline vulnerability in order to investigate any differing effects of insomnia and negative affect on paranoia in the presence of high or low vulnerability to psychosis. For example, the impact of sleep disturbances on negative affect and paranoia in those more vulnerable to psychosis may be greater than those at a low vulnerability. Reasoning biases and affective experiences have been convincingly integrated into theoretical accounts paranoid thinking (Freeman et al., 2002). Bentall et al. (2009) for example used SEM techniques to conclude that the best fitting and most parsimonious structure of the mechanisms contributing to paranoia account for both emotion and cognitive related processes. It would be interesting to understand the impact of insomnia interventions on cognitive reasoning biases often associated with paranoid thinking such as jumping to conclusions. Should improvements in sleep lead to a reduced tendency to jump to conclusions (or not), then further insight into the mechanisms by which sleep disturbance exerts its effect on paranoia may be gathered.

### Conclusions

The current study provides the first RCT demonstrating investigating the effect of a self-help CBTi intervention on affective symptoms and paranoia experience. The findings suggest that interventions targeting insomnia may have germane benefits to the experience of depression and anxiety as well as paranoia. The manipulation of insomnia, accompanied by improvement in negative affect and reduction in paranoid thinking adds support for the notion that insomnia is causally related to the experience of negative affect and paranoia. We conclude that, although more research is needed particularly to examine and promote the long-term effects of such interventions, clinicians should consider the use of interventions targeting sleep problems among those who experience distressing affective symptoms, and/or persecutory belief.

# General discussion

## Summary of main findings

This thesis describes three strands of research designed to; (i) investigate whether self-help interventions can be used by those with psychosis experiences; (ii) establish sleep difficulties as a closely associated experience alongside negative affect and paranoid thinking; and (iii) demonstrate the efficacy of self-help interventions which target sleep in ameliorating paranoia. This final chapter will discuss the main findings before considering their theoretical and practical implications.

### Self-help interventions have potential for psychosis

Chapter 3 described a meta-analysis designed to quantitatively synthesize extant studies investigating the efficacy of self-help interventions on the symptoms of psychosis and the associated emotional outcomes such as quality of life, distress and depression. Self-help interventions had a small-to-medium sized effect on the symptoms of psychosis with larger effects seen for positive symptoms. However, the effect of self-help on associated emotional outcomes, albeit statistically significant, was much smaller. Self-help interventions can, therefore, have comparable effects on the symptoms of psychosis as have been described for depression and anxiety in other reviews (e.g., Bower et al., 2001; Gellatly et al., 2007; Haug et al., 2012; Hirai & Clum, 2006; Marrs, 1995; Spek et al., 2007). In addition, Chapter 3 found that self-help interventions that incorporate an element of guidance (either through professionals or peers) were associated with larger effect sizes than interventions with no guidance at all, a finding echoed in previous reviews (Gellatly et al., 2007; Marrs, 1995). Self-help interventions for psychosis, therefore, have much potential. However further research is needed, particularly high quality randomised controlled trials investigating the use of CBT based self-help interventions for psychosis. Finally, in one study of self-help interventions for psychosis analysed in Chapter 3, sleep difficulties were successfully targeted in a bid to indirectly reduce the symptoms of psychosis and associated factors such as quality of life (Bloch et al., 2010). Improving sleep difficulties as a means to improve psychosis outcomes is an interesting route, and one which is in the early stages of research (Freeman et al., 2010; Freeman et al., 2009; Freeman et al., 2015; Freeman et al., 2012; Freeman et al., 2013; Harvey et al., 2015).

### Insomnia types differentially impact on negative affect and paranoia

Chapter 4 then, sought to develop extant literature on the relationship between insomnia and a common psychosis experience, paranoia. Previous research into the relationship between insomnia and paranoia has not differentiated between sleep onset and sleep maintenance insomnia (Freeman et al., 2010; Freeman et al., 2009; Freeman et al., 2012); however they are two distinct factors of insomnia which can act differentially on negative affect and paranoia (Taylor et al., 2005). Chapter 4 used exploratory factor analysis to improve the measurement of insomnia, negative affect and paranoia before using structural equation modelling to examine the relationship among these variables. It was found that problems falling to sleep, but not problems staying asleep, have a significant impact on paranoia experience. However, the present thesis represents the first investigation of insomnia type on paranoid thinking, and the majority of extant literature looking at insomnia type and negative affect suggests no differences between sleep onset and sleep maintenance insomnia (Brabbins et al., 1993; Kim et al., 2000; Newman et al., 1997; Querasalva et al., 1991; Riedel & Lichstein, 2000). Consequently the finding that it is sleep onset difficulties and not sleep maintenance problems that are associated with negative affect and paranoia warrants further study.

### Perceived, but not objective sleep difficulties, are associated with paranoia

Chapter 4 found that objective indices of sleep quality were not related to levels of negative affect or paranoia, suggesting that it is perceived sleep quality, rather than the actual sleep quality that is linked to affective experience and paranoid thoughts. This notion has important implications for the treatment of insomnia, and by extension, paranoia. More specifically, the findings of Chapter 4 suggest that, by addressing maladaptive perceptions about sleep quality, rather than actual sleep quality, interventions can improve sleep, reduce affective experiences and thus ameliorate paranoid thinking. Interventions based on the principles of CBT seem best placed to address these perceptions of sleep quality and have been found to be successful when applied using a self-help format (Ho et al., 2015; Lancee et al., 2012). For example, one problematic thought process often associated with sleep onset insomnia is related to the amount of hours slept per night (e.g. “*I must sleep at least eight hours or I will not be able to function tomorrow*”). Interventions based on the principles of CBT can address this misconception by encouraging the participant to change their thought processes to be more in line with reality (e.g. “*even if I sleep for six hours tonight, then I will still be able to function well tomorrow*”). By doing this, the distress and arousal often associated with maladaptive rumination about sleep (or lack of) can be reduced leading to improved sleep quality (Harvey, 2002). Chapter 5 demonstrated this principle by reporting that a CBT based self-help intervention for insomnia lead to improvements in negative affect and paranoia.

### Sleep difficulties are not directly linked to paranoia

The impact of sleep onset difficulties is, however, not directly associated with paranoid thinking, but rather the relationship is mediated by negative affect. That is, problems falling to sleep increase negative affect (e.g., levels of depression, stress and anxiety), which in turn, impact on levels of paranoid thinking. The findings of Chapter 4 support this idea, as does previous research. For example, sleep difficulties go hand in hand with affective experiences (Taylor et al., 2005) and have been shown to be predictive of negative affect (Baglioni et al., 2011). These affective experiences are strongly associated with the formation and maintenance of paranoid thoughts, with evidence to suggest this relationship is causal (Fowler et al., 2012; Kramer et al., 2014; Lincoln et al., 2010; Lincoln et al., 2009; Thewissen et al., 2011; Vorontsova et al., 2013). On one hand, this finding compliments previous research in that the present thesis suggests an integral role for negative affect in the relationship between sleep difficulties and paranoid thinking (Freeman et al., 2010; Freeman et al., 2009; Freeman et al., 2012). However, unlike previous research, this thesis prescribes a more important role for negative affect in the relationship between sleep difficulties and paranoia. Namely, that affective experiences are a ‘gateway’ to paranoid thinking, a gateway that can be, in part, held open by difficulties sleeping.

### Self-help interventions for sleep difficulties can reduce paranoia

Self-help interventions have been shown to effectively reduce the symptoms of psychosis (Chapter 3), negative affect (Cuijpers, Donker, et al., 2010; Cuijpers & Schuurmans, 2007; van't Hof et al., 2009) and sleep difficulties (Ho et al., 2015; van Straten & Cuijpers, 2009). Furthermore, as shown in Chapter 4, sleep difficulties are significantly associated with a common psychosis symptom, paranoia (Freeman et al., 2010; Freeman et al., 2009; Freeman et al., 2012). With this in mind, Chapter 5 developed and evaluated the effects of a self-help intervention designed to improve sleep in a bid to reduce paranoia. An online, self-help intervention based on the principles of CBT (Sleep Healthy) was developed in line with the findings presented in Chapter 4. The intervention resulted in significant reductions in insomnia, negative affect and paranoia at post-intervention; however no statistically significant reductions were seen at the 4 and 18-week follow-up points. This could, however, have been due to a relatively high level of attrition as effect size estimates revealed medium sized effects of the self-help intervention. The implication, therefore, is that self-help interventions based on CBT can lead to (at least short-term) improvements in affective experiences and paranoid thinking. This suggests that insomnia plays a causal role in shaping negative affect and paranoid thinking. However, future research should further evaluate the long-term effects of such interventions and incorporate methods designed to improve engagement and retention with self-help interventions.

## Theoretical and practical implications

 This section of the discussion evaluates the clinical, theoretical and practical implications of the findings.

### Self-help interventions for psychosis

 Chapter 3 found that self-help interventions have potential benefits for those with psychotic experiences. Furthermore, Chapter 5 demonstrated that self-help interventions can be used to ameliorate a common experience of psychosis (namely, paranoia), by improving sleep. Therefore, this thesis points to two possible routes to using self-help interventions for psychosis; (i) target psychosis symptoms and associated outcomes directly (Chapter 3); and/or (ii) target an associated aggravating factor such as sleep difficulties (Chapters 4 and 5). That being said, much more research is needed and more developed consideration of the practicalities of self-help for psychosis is warranted. For example, in what situations and environments could self-help interventions for psychosis be used to full effect? And what are the barriers to the uptake of, and engagement with, self-help interventions for psychosis? These questions are considered below.

#### Where would self-help for psychosis fit in models of treatment delivery?

The most obvious answer to this question is that self-help for psychosis would fit neatly into a stepped care system, much like self-help for depression and anxiety. The stepped care system is one which offers the ‘least restrictive’ treatment option as the first port of call (often interpreted as one which is the least time intensive for the therapist, Bower & Gilbody, 2005). In this regard, a low intensity intervention that requires little input from a therapist (e.g. self-help) would be offered in the first instance. However, should this option be deemed inappropriate by the patient and/or therapist, then changes would be made in the form of ‘stepping up’ to a more intensive treatment option. Self-help interventions, therefore, are ideal for use within a stepped-care system as they represent a relatively low-intensity treatment option. Furthermore, it is clear that symptoms synonymous with psychosis are experienced by a substantial proportion of the general population (Krabbendam et al., 2004; van Os et al., 2009; Verdoux & van Os, 2002). Therefore, self-help interventions for psychosis could follow a similar approach to that suggested by Jorm and Griffiths (2006) in relation to self-help for common mental health problems. Jorm and Griffiths argue that those presenting sub-clinical, threshold symptoms of depression and anxiety should be a target for early, preventative action. A similar approach has been advocated for psychosis (Marshall & Rathbone, 2006; McGorry et al., 2008) and self-help interventions might be investigated further as a possible treatment option for those with mild to moderate symptoms of psychosis as part of an early intervention strategy.

#### Barriers to uptake and engagement

The present thesis suggests that self-help interventions can offer significant reductions in symptoms and outcomes associated with psychosis experience. However, one important issue concerns the uptake and engagement of self-help. Interventions can only be effective if people engage with the materials (Donkin et al., 2011). However, evidence suggests that engagement with self-help interventions is relatively poor (Donkin et al., 2011) and there was substantive drop out from the self-help intervention described in Chapter 5. Future studies investigating the efficacy of self-help interventions for psychosis and its related symptoms might, therefore, usefully consider rates of uptake and engagement, along with strategies that might promote uptake.

 There is; however, evidence to suggest that interventions that are explicitly designed to tackle such concerns can increase uptake (e.g., Sheeran, Aubrey, & Kellett, 2007) and such ideas might usefully be incorporated into self-help interventions. For example, the use of if-then plans, otherwise known as ‘implementation intentions’ was suggested as one possible strategy to aid uptake and engagement with the self-help intervention described in Chapter 5. If-then plans “link suitable opportunities to act (specified in the *if* part of the plan) with instrumental responses to those opportunities (specified in the *then* part of the plan)” (Varley et al, 2011, p. 123). One aspect of the self-help intervention described in Chapter 5 attempted to change behaviours that are not conducive to a good night’s sleep by offering alternative strategies. For example, when a person is struggling to fall to sleep, it is not recommended that they continue to toss and turn if sleep onset is not forthcoming (Lance et al., 2012). Instead it is advised that they leave their bedroom and attempt another task until they feel ready to sleep. Implementation intentions would be ideal in this scenario to encourage adoption of this particular sleep strategy (e.g. *if* I am struggling to fall to sleep, *then* I will read in another room for 15 minutes).

Self-help interventions overcome many of the practical barriers that are associated with face-to-face therapies including the costs of therapy, transportation difficulties and issues with childcare or caring for sick or disabled loved ones (Mohr et al., 2006; Mohr et al., 2010). However, mental health (il)literacy (or a lack of knowledge about symptoms and diagnoses, Jorm, 2000) may be a potential barrier to successful engagement with self-help interventions. For example, not knowing that a given set of symptoms warrants medical attention, or the misattribution of symptoms to other factors such as stress or substance misuse can make seeking out the correct support difficult (Gillard et al., 2010; Tanskanen et al., 2011). One potential solution is to provide feedback on symptoms in an effort to promote knowledge and such ideas have recently been incorporated into a self-directed eHealth intervention for those with depression and anxiety (Lillevoll, Vangberg, Griffiths, Waterloo, & Eisemann, 2014).

A final factor to consider in relation to uptake and engagement is how acceptable people perceive self-help and minimal interventions to be. As Bower and Gilbody (2005) assert, people offered self-help interventions might feel that they are inappropriate (Scogin et al., 2003), especially for more severe mental health problems (Landreville et al., 2001). Evidence on the perception of self-help interventions is limited. However, Hanson, Webb, Turpin, and Sheeran (2015) found that guided self-help for depression was deemed to be as acceptable as face-to-face treatments such as psychotherapy, although pure forms of self-help were less preferred. Future research might apply a similar approach to investigate peoples’ attitudes toward self-help for psychosis. Practitioners may also have concerns regarding recommending self-help, (e.g., that self-help interventions cannot address the complex and wide-ranging presentations seen in mental health, (Pratt et al., 2009). It may be prudent, therefore, for future research developing self-help interventions for psychosis to find ways to tackle such concerns.

### Sleep difficulties are in the eye of the beholder

 Chapter 4 found that it was perceived (i.e., self-reported) sleep quality that was associated with negative affect and paranoia rather than actual (i.e., objectively assessed) sleep quality. It would seem, therefore, that interventions which aim to change perceptions and maladaptive thought processes regarding sleep would be the most beneficial. Indeed, self-help interventions based on the principles of CBT have been shown to be particularly helpful in improving insomnia (Ho et al., 2015; van Straten & Cuijpers, 2009). Such interventions often attempt to change maladaptive thought processes (e.g., “*I must sleep at least eight hours or I will not be able to function tomorrow*”) to be more in line with reality (“*even if I sleep for six hours tonight, then I will still be able to function well tomorrow*”). This restructuring of the way that people perceive their sleep can serve to reduce the distress and worry that often goes hand in hand with sleep difficulties (Lancee et al., 2012). Chapter 5 tested this notion by investigating the impact of a CBT based self-help intervention, reporting promising findings. Future research should continue to explore CBT for insomnia in a bid to ameliorate psychotic experiences such as paranoia, as Myers et al. (2011) have done. Some of this work is already planned. For example, Freeman et al. (2013) aims to report the findings of the Better Sleep Trial (BEST), a randomised controlled trial assessing the impact of a CBT intervention for insomnia on hallucinations and delusions. Similarly, Freeman et al. (2015) aims to provide a comprehensive RCT of CBTi for psychosis-like experiences (including paranoia) in over 2000 students with insomnia.

### Self-help for sleep difficulties and paranoia: a role for emotion regulation?

Negative affect is closely associated with both sleep difficulties (Baglioni et al., 2011; Taylor et al., 2005) and paranoia (Bentall et al., 2009; Lincoln et al., 2010; Lincoln et al., 2009). Therefore, a further target for interventions could be to help people to identify and use effective strategies for regulating their emotions. The need for more adaptive regulation of negative emotions among people who experience paranoia is apparent, with persecutory ideation associated with difficulties regulating emotion (Westermann et al., 2013; Westermann et al., 2012; Westermann & Lincoln, 2011; Westermann et al., 2014). Furthermore, inadequate sleep is not only associated with a decreased ability to regulate emotion (Baum et al., 2014; Gruber & Cassoff, 2014; Mauss et al., 2013), but can also interfere with a wide range of executive functions that may be important to the effective regulation of emotion (Alhola & Polo-Kantola, 2007; Durmer & Dinges, 2005; Killgore et al., 2006). Consequently, the problems with emotion regulation often seen in those with heightened persecutory thinking may be exacerbated when sleep is disturbed. Emotion regulation strategies have been shown to be efficacious (Webb et al., 2012) and interventions that combine strategies for dealing with insomnia alongside strategies for improving emotion regulation may be particularly successful in reducing paranoia. For example, Aldao, Nolen-Hoeksema, and Schweizer (2010), in a meta-analysis of 114 studies, investigated the effect of both adaptive (acceptance, reappraisal and problem solving) and maladaptive (rumination, avoidance and suppression) emotion regulation strategies across four areas (anxiety, depression, eating, and substance-related disorders) in both clinical and non-clinical groups. The authors reported that adaptive emotion regulation strategies are effective across a range of symptoms, particularly problem solving. Interestingly, maladaptive emotion regulation strategies were more strongly related to psychopathology than adaptive strategies, indicating that adopting maladaptive strategies is more deleterious than the absence of adaptive emotion regulation. With this in mind future interventions may wish to prioritize the reduction of maladaptive strategies and encourage the use of problem solving which may act as a barrier to the adoption of maladaptive emotion regulation.

### Augmenting self-help interventions to improve efficacy

Chapter 3 reported that self-help interventions for those with psychosis were more beneficial when they incorporated an element of guidance, provided either by professionals or peers. This finding is not uncommon in the self-help literature, with guided self-help interventions offering superior efficacy for insomnia outcomes (Ho et al., 2015) as well as depression and anxiety (Gellatly et al., 2007; Marrs, 1995). Furthermore, Chapter 3 demonstrated that the contact with a professional or peer can be provided face-to-face (e.g. group meetings) or remotely (e.g. via the internet) to equal effect. Consequently, future research may wish to augment self-help interventions for sleep and paranoia through the addition of guidance, either face-to-face or remote, particularly if they are used with more clinically defined groups.

### Sleep as a risk factor for psychosis transition

In recent years there has been a search for factors that can predict transition to psychosis (Mason et al., 2004; Olin & Mednick, 1996; Semple, McIntosh, & Lawrie, 2005; Yung, Phillips, Yuen, & McGorry, 2004). This is in part due to improved outcomes when interventions are implemented early (e.g., among those who are at risk of developing more severe forms of psychosis) rather than late (Stafford, Jackson, Mayo-Wilson, Morrison, & Kendall, 2013). Both longitudinal and intervention research has suggested that sleep difficulties can precede a wide range of mental health problems, with some researchers asserting that sleep is a transdiagnostic process (Dolsen, Asarnow, & Harvey, 2014; Harvey, Murray, Chandler, & Soehner, 2011). That is, sleep is aetiologically central to various forms of psychopathology given its ubiquitous presence in mental health complaints.

Although this omnipresence may lead some to believe sleep is too non-specific to psychosis to hold predictive value (Lee et al., 2012; Zanini et al., 2013), a growing body of literature suggests that sleep difficulties can be one key risk factor for the transition to psychosis (Zanini et al., 2013). For example, sleep disturbances have been found to be the most common prodromal symptom among those experiencing a first episode of psychosis (FEP)(Yung & McGorry, 1996b) and occur before FEP in 77-100% of participants (Tan & Ang, 2001; Yung & McGorry, 1996a). Furthermore, Lee et al. (2012) investigated the relationship between psychosis like experiences (PLEs) and sleep difficulties in adolescents, concluding that adolescents with insomnia were over four times more likely to experience PLEs after controlling for variables such as age, gender and depression. This finding has been mirrored in subsequent studies with large samples, with Jeppesen et al. (2015) reporting that among 1,632 11-12 year olds, sleep difficulties were significantly more common in those with a higher incidence of PLEs than those without PLEs. Evidence as to the causality of sleep difficulties in the transition to psychosis is limited; however, the few studies to date suggest sleep contributes causally (Chemerinski et al., 2002; Lunsford-Avery & Mittal, 2013; Ruhrmann et al., 2010; Thompson et al., 2015; Zanini et al., 2013).

## Directions for future research

 The present thesis has demonstrated that self-help interventions have potential for those experiencing psychosis; that sleep difficulties are associated with a common psychosis experience (paranoia); and that sleep can be targeted as a means to reducing paranoia. However, there are many areas of research that need further clarification, along with questions that need answers. In particular, there is a need for (i) more high quality randomised controlled trials of self-help for psychosis; (ii) for longitudinal research examining the causal role of sleep in the formation and maintenance of paranoia; and (iii) to investigate sleep difficulties as a predictor of the transition to psychosis. Each of these suggestions for future research are developed below.

### CBT based self-help for psychosis: The need for high quality randomised controlled trials

 Chapter 3 showed that self-help interventions were efficacious for both the symptoms of psychosis and emotional outcomes that are often associated with the experience of psychosis symptoms. However, it was noted that the literature on self-help for psychosis was lacking in two areas; (i) a limited number of studies (*k* = 2) have investigated CBT based self-help for psychosis; and (ii) there were relatively few high quality randomised controlled trials of self-help for psychosis. Given the success of CBT for psychosis, future research should investigate its applications to self-help interventions. Furthermore, chapter 3 recommends that future evaluations of self-help for psychosis should prioritize well-constructed, high quality research designs. These designs should take the form of randomised controlled trials (RCT), comparing the efficacy of self-help interventions against different control groups (such as treatment as usual, wait-list controls). High quality RCTs should have several features (Sibbald & Roland, 1998); (i) participants should be randomly allocated to the study groups; (ii) participants, and if possible researchers, should be unaware of group allocation (blind and double blind); and (iii) any analysis should be based on an intention to treat analysis (ITT).

By ensuring future research adheres to the criteria outlined above, potential sources of bias can be controlled leading to a more accurate estimate of treatment efficacy. Randomising participants for example serves to limit selection bias in the assignment of participants to groups, facilitate both researcher and participant blinding and also ensures a similar distribution of characteristics across each group (Altman et al., 2001). Blinding in particular is an area highlighted in chapter 3 that is lacking in the extant self-help for psychosis literature. Knowledge of group assignment in clinical trials can affect participant responses and induce researcher bias, giving a skewed representation of treatment efficacy (Schulz et al., 2002). Finally, research reporting the effects of an intervention should base their findings on an intention to treat analysis. ITT analysis includes all participants originally allocated to a group “regardless of whether they actually satisfied the entry criteria, the treatment actually received, and subsequent withdrawal or deviation from the protocol” (Hollis & Campbell, 1999, p. 670). ITT analysis is intricately linked with the randomisation process. For example, after having successfully randomised participants to a group, many participant’s dropout or fail to follow protocol which has the effect of undermining the randomisation process. By including all participants regardless of whether they completed the trial, an estimate of treatment effectiveness (the extent to which an intervention affects change in an outcome under real world settings) can be observed as well as treatment efficacy (how well does the intervention affect change under ideal settings).

The present thesis sought to address both of these concerns in Chapter 5, in which a high quality randomised controlled trial investigated the impact of a CBT based self-help intervention on a common experience of psychosis (paranoia). In chapter 5 for example, participants were randomly allocated to either the intervention group, the sleep diary group (active control) or the wait-list control group. Furthermore, chapter 5 represents a double blind RCT, in which both the researchers and the participants were given no indication as to group allocation. An ITT analysis was also used whereby all participants providing data were included in the analysis regardless of compliance or attrition. Chapter 5, therefore, represents the type of high quality randomised controlled trial that is required in order for self-help for psychosis to advance. It is hoped the present thesis will stimulate more research of this nature.

### The impact of a self-help intervention for insomnia on the symptoms of psychosis: A randomised controlled trial

The present thesis has shown that self-help interventions for sleep can impact on a common symptom of psychosis; namely, paranoia. However, this was demonstrated in a non-clinical sample and only one symptom of psychosis was measured. Although the continuum approach to psychosis research posits that studies using non-clinical groups can inform clinical populations (Verdoux & van Os, 2002), the question remains; can improving sleep lead to improvements in both the positive (a sensory perception experienced in the absence of an external stimulus, Silbersweig et al., 1995) and negative (e.g., withdrawal or lack of thoughts, feelings, and behaviors that are usually present, Sommers, 1985) symptoms of psychosis in clinically defined populations? Replicating the procedure described in Chapter 5 in those with a diagnosis of a psychosis spectrum disorder, using a more broad measure of the experience of psychosis (e.g., the Positive and Negative Syndrome Scale, Kay et al., 1987) would be interesting. This would allow for two questions to be addressed; (i) can self-help interventions improve sleep in those with more severe psychosis experiences?; and (ii) is this improvement met by reductions in both the positive, and negative symptoms of psychosis?

Extending this idea further, Chapter 4 reported the integral role of negative affect in insomnia and paranoia experience, suggesting that emotion regulation strategies could be effective in reducing paranoia. Consequently, if the study described in Chapter 5 were to be replicated, then the intervention could be expanded to incorporate emotion regulation strategies. Ideally, this study would consist of 4 groups; (i) one group receiving a CBT self-help intervention aimed at sleep only; (ii) a group receiving a self-help emotional regulation intervention only; (iii) a group receiving self-help for both sleep and emotion regulation; and (iv) a wait-list control group. The results of this study would allow conclusions to be made regarding the role of emotion regulation in both sleep and paranoia experience.

### The need for longitudinal studies of insomnia as a predictor of persecutory ideation

Chapter 4 adopted a cross sectional design, meaning that it provided limited insight into the causal nature of the relationships between sleep onset problems, negative affect, and paranoia. While Chapter 5 provided some causal evidence and the direction of the putative relations are supported by extant literature, this does not preclude the presence of a bidirectional relationship to the extent that paranoid thinking might exacerbate sleep difficulties and / or negative affect that, in turn, increase paranoid thinking. Therefore, more longitudinal research is needed that can disentangle these relations. To date, only one study has attempted to investigate the direction of the relationships between insomnia, negative affect and paranoia using a prospective design (Freeman et al., 2012), finding that insomnia, worry, anxiety, and depression were all significant predictors of new and persisting paranoid thinking. This study does provide an insight, which together with previous research and the present thesis, constitutes reasonable evidence as to the causality of sleep difficulties in paranoia. However, Freeman et al. used only two items from the psychosis screening questionnaire to capture the experience of paranoia. These measures were chosen more for pragmatic reasons rather than the choice of the researchers (the items formed part of the pre-existing national psychiatric morbidity survey) and, as Freeman et al. point out, these questions “provided a limited capture of the variety of paranoid ideation, and fleeting persecutory ideation is unlikely to be captured by two assessments over a year apart” (p. 1202). As a result, more longitudinal research is necessary to better capture the nature of the relationships between paranoia and sleep difficulties.

### Sleep difficulties as a risk factor for psychosis

As discussed earlier, sleep complaints are ubiquitous in mental health and have been considered a transdiagnostic factor (Dolsen et al., 2014; Harvey et al., 2011). Although a narrative review of sleep as a possible risk factor for psychosis in high risk populations has already been published (Zanini et al., 2013), there has been no attempt to quantitively synthesise these findings. Meta-analysis is often considered the gold standard of epidemiological research as it is able to provide a standardized account of a range of diverse research (Simonds et al., 2005). Furthermore, as shown in Chapter 3, meta-analysis is able to investigate factors which moderate relationships; here between sleep difficulties and the experience of psychosis. In this case, the potential factors which moderate the impact of sleep disturbances as a risk factor for psychosis transition can be elucidated using meta-analysis. Consequently, research which can provide a standardised overview of the impact of sleep disturbances as a risk factor for psychosis, while reporting factors which influence this relationship would be particularly beneficial to clinical practice and theory.

## Concluding remarks

 This thesis has demonstrated three key findings; (i) self-help interventions are a viable treatment option those with psychosis; (ii) sleep difficulties are associated, potentially causally, with affect and the experience of paranoia; and (iii) sleep difficulties are a possible target for self-help interventions designed to reduce paranoid thinking. However, much more research is needed. First, more high quality randomised controlled trials of self-help interventions for psychosis are needed. Second, although the present thesis provided evidence as to the causality of sleep difficulties in paranoid thinking (chapter 5), more longitudinal research is warranted. Finally, self-help interventions targeting sleep can reduce paranoid thinking and negative affect, however what about other psychotic experiences? For example, does improving sleep lead to reductions in hallucinations as well as delusions? Moreover do the reductions in paranoia seen in a non-clinical sample hold for more clinically defined groups? These are questions future research should address; however, for now this thesis represents a solid starting point.

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1. No studies eligible for inclusion specifically studied paranoia. Therefore, the impact of self-help interventions on paranoia, unlike subsequent chapters, is not investigated in Chapter 3. [↑](#footnote-ref-1)
2. What constitutes a trivial effect size is open to debate and should be based on what effect size would be considered trivial in a given scenario. For example, an intervention such as self-help, which can be offered to large populations with few, if any, side effects and low costs may have a particularly small trivial effect size; in other words, even a small effect may be beneficial when weighed against any disadvantages. Conversely, an intervention with relatively high risks and costs may incur a large trivial effect size as the cost-benefit ratio maybe skewed towards cost (e.g. invasive surgery, medications etc.). We set a trivial effect size of *d* = 0.10, meaning that the fail-safe *N* reported here represented the number of studies needed in order to reduce the effect to *d* = 0.10. [↑](#footnote-ref-2)
3. Cross loadings greater than .36 were deemed substantive according to Steven’s (2002) criteria. [↑](#footnote-ref-3)
4. This decision was taken for two reasons; (i) a better model fit was found by Henry and Crawford (2005) when depression, stress, and anxiety were combined to form negative affect; and (ii) combining these constructs allowed fewer parameters to be estimated in the CFA and path analysis. [↑](#footnote-ref-4)
5. *N* = 108 is a minimum requirement, in actual fact more participants were recruited as the attrition rate in online studies is usually relatively high. [↑](#footnote-ref-5)