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Group treatment of anxiety-related insomnia using cognitive-behavioural therapy

A thesis presented in partial fulfilment of the requirements for the degree of

Doctor of Clinical Psychology

at Massey University, Wellington, New Zealand.

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Preface

Before undertaking this project my knowledge of insomnia was quite limited; difficulties with sleep were just that. Little did I know how fascinating the fields of sleep and insomnia were. The timing of the Massey University Psychology Clinic's interest in offering a treatment for people "who can't sleep and worry too much" coincided with a shift in the research literature about insomnia. Incidentally, anxiety appears to play a major role in the development and maintenance of insomnia complaints. This project also brought me close to the participants' experience of insomnia. I understood that sleep difficulties were never just that. They affected a person's relationships, work, mental health, and quality of life.

The current project would not have been possible without the support of my supervisors Dr Duncan Babbage and Prof. Janet Leathem. I would also like to thank Prof Philippa Gander for her comments and encouragement along the way. My beautiful family, who had to share me with my work and studies for so many years, it has been a long journey, and now I look forward to being a mum and wife-to-be (and only share you with my work). I also would like to acknowledge John Rutledge, who was like a father to me. I know you would be proud of this moment, John. My dearest family in Brazil, far away from the daily working-on-a-doctorate-life, but nonetheless were always part of this journey. I love you and I miss you. Finally, thank you to all the participants in this study. In receiving help for yourselves, you also helped many others.

This study has received approval from the Central Regional Ethics Committee.

Abstract

Insomnia affects 25% of the New Zealand population and up to 33% of the population worldwide. Untreated it incurs high economical costs to society and takes its toll on the people's mental health, physical health, and quality of life. Psychological treatments for insomnia have developed over the decades to reflect the scientific literature's knowledge about the causal and maintaining factors of insomnia (i.e., maladaptive behaviours and cognitions about sleep and the consequences of insomnia and physiological and cognitive arousal).

The critical review found that although physiological and cognitive arousal play a significant role in the development and maintenance of insomnia and there is some evidence that anxiety disorders predict the development of insomnia, few published treatment programmes targeted all causal and maintaining factors as described in the literature. The current main clinical study investigated the effectiveness of a group therapy programme that targeted all the main factors described in the literature. Twenty-eight participants suffering chronic insomnia and at least subclinical anxiety or stress were randomly assigned to one of two treatment interventions, administered through five treatment groups. Each group had 5-6 participants. Two groups received the *insomnia first* intervention (n = 11) and three groups received the *anxiety first* intervention (n = 17). Within- and between-subjects analyses were performed. Follow-up assessment took place about three months after the end of each treatment group.

The main study found that targeting anxiety (i.e., physiological and cognitive arousal) directly improved participants' insomnia, $t(1708) = 3.574$, p

<.001, *d* = .86. At three months post-treatment, both treatment conditions had large effect sizes on measures of insomnia severity (*insomnia first d* = 3.35; *anxiety first d* = 1.17) and sleep efficiency (*insomnia first d* = 1.09; *anxiety first d* = 1.17). However, in examining the outcome trajectories, the anxiety first intervention produced more consistent improvement across the course of the therapy sessions, which might be more desirable for both clients and clinicians.

This study provided evidence that a cost-effective group intervention is beneficial for symptoms of insomnia and anxiety, and it also significantly improves participants' quality of life. While some findings need replication (e.g., order of interventions), this study showed not only that insomnia can and should be treated, but also that its assessment and treatment must address anxiety as well as sleep. Given the high occurrence and co-morbidity of insomnia, and its detrimental effects for the individual and the society, psychological interventions for insomnia should be more readily available in New Zealand.

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Introduction

Insomnia is a difficulty in initiating and maintaining sleep and is associated with several mental health and physical conditions, such as anxiety disorders and chronic pain and cancer (Ohayon, Caulet, & Lemoine, 1998; R. Stewart et al., 2006; Taylor, Mallory, et al., 2007). Insomnia has been traditionally seen as a symptom that would resolve itself once the main cause has been addressed (Harvey, 2001). Research in the last two decades (e.g., Espie, 2007; Harvey, 2002a) showed that several factors are involved in the development and maintenance of insomnia (e.g., dysfunctional thoughts and behaviours associated with sleep and insomnia, anxiety disorders, and physiological and cognitive arousal). Improvements in insomnia were observed when it was specifically targeted during treatment for co-morbid medical and psychiatric conditions (Smith, Huang, & Manber, 2005). Untreated insomnia is costly to society, particularly in regards to absenteeism from work (Daley, Morin, LeBlanc, Gregoire, & Savard, 2009).

Rationale

The present study came about because the Director of the Massey University Psychology Clinic was considering developing a group treatment for insomnia as part of the range of services offered by the clinic. From observation of clinical practice, the director of the clinic noticed a population who identified problems with insomnia and worry or stress (essentially, people who lie awake at night worrying) but there were no interventions offered by the clinic that were specifically designed to address such complaints. This lead to a partnership between the psychology clinic and the university to identify the best

way to provide this new service. During the first stage of the project, the principal investigator and another doctoral student, under the guidance of senior clinical psychologists, developed the treatment manual based on established interventions for anxiety and insomnia published in the scientific literature. From a cognitive-behavioural perspective, the treatment programme targeted insomnia and anxiety. Anxiety is defined as the emotional experience associated with threat-oriented thoughts that are distressing and physiologically arousing in nature, and that are associated with avoidance or other safety-seeking behaviours (cf. A. T. Beck, 1976; J. S. Beck, 1995; Greenberger & Padesky, 1995; Salkovskis, 1991). The manual was organised to allow for flexibility in combining the anxiety and insomnia sections. It was agreed that the psychology clinic would trial two versions of the therapy and the most successful intervention would be implemented.

Research questions

There is much evidence from research demonstrating association between insomnia and anxiety and arousal (e.g., Carney & Edinger, 2010; Espie, 2002; Espie, Broomfield, MacMahon, Macphee, & Taylor, 2006; Jansson-Frojmark & Linton, 2008; Jansson & Linton, 2007; Riemann et al., 2010), and as will be seen in Chapter Two, many psychological treatments of insomnia are not targeting all the known factors involved in the development and maintenance of insomnia.

The current study proposed to investigate the effectiveness of a cognitive-behavioural group intervention for anxiety and insomnia. Potential participants were people in the general population who presented with sleep difficulties and who also reported excessive worrying that interfered with sleep. The study

design (described in detail in Chapter Three) allowed comparison of two ways of integrating the anxiety and insomnia treatments, and the examination of the specific effect of insomnia intervention on anxiety symptoms and vice-versa. More specifically the present study aimed to answer the following questions:

- Can anxiety treatment improve insomnia?
- What is the best way to combine the treatments for anxiety and insomnia?
- How effective is a group treatment for anxiety and insomnia?
- What are the effects of insomnia treatment on people's quality of life?

Research overview

This thesis demonstrates not only how insomnia and anxiety are related but also why insomnia and anxiety treatments should be concurrent. This thesis has three main parts:

- A critical literature review that, in examining insomnia models and psychological treatments for insomnia, illustrates the (lack of) concordance between theory and psychological practice.
- A group therapy study investigating the effectiveness of a sequentially combined anxiety and insomnia treatment, and whether order of treatment influences outcome.
- A mixed-method quantitative and qualitative study that examines some of the participants' scores in greater detail and illustrates their experiences of going through the group therapy programme.

The thesis begins with a brief introduction to the current project (the current chapter). Chapter Two comprises an overview of published models of insomnia classified into main causal and maintaining factors, followed by a review of sixty-nine studies of psychological treatments of insomnia. It will be argued that insomnia is associated with diagnosable anxiety disorders and arousal (both cognitive and physiological), but few psychological treatments fully address these components, exposing a gap between psychological theory and practice. Chapter Three will present the cognitive-behavioural group therapy programme developed to target both insomnia and anxiety in 28 participants, and discuss its main findings. Chapter Four will focus on a quantitative-qualitative analysis of the experience of a subsample of six group therapy participants with differing levels of anxiety and stress. Finally Chapter Five will conclude with the thesis' main findings, contributions to the literature, limitations of the current project, and opportunities for further studies.

Some sections of the thesis are presented in a format ready for publication (Chapters Two, Three, and Four), and this is in accordance with Massey University regulations for submitting a dissertation by publication. These chapters have their own set of references immediately at the end of each chapter as it would normally appear in a journal article. A full reference list covering all citations for the entire thesis—both the papers and the other chapters (Chapter One Introduction and Chapter Five Discussion)—is provided at the end of the thesis. Statements are incorporated into the dissertation at the end of these sections stating the role of each co-author of the manuscripts presented in these sections.

Paper One

Insomnia treatments: Do existing psychological treatments match current models of insomnia?

Note:

This chapter is presented in a manuscript format and it is intended to submit this manuscript for peer-review and possibly publication. Other manuscripts are referenced as chapters for this thesis only and part of the material in the appendix was included for examination purposes only.

Running head: *Insomnia aetiology and psychological treatments*

Insomnia treatments: Do existing psychological treatments match current models of insomnia?

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Key words: insomnia; sleep; anxiety; arousal; psychological treatments; insomnia; insomnia etiology; cognitive-behavioural therapy; cognitive therapy; behavioural therapy; CBT.

Abstract

Objective**:** This paper examines whether psychological treatments for insomnia target the causal and maintaining factors identified in insomnia models.

Methods**: I**nsomnia etiological theories were examined to identify the common causal and maintaining factors common across these theories. These factors were classified into four categories: sleep behaviour, sleep cognitions, physiological arousal, and cognitive arousal. Databases (PsycINFO, Psychology and Behavioural Sciences Collection, Medline, and Google Scholar) were searched using terms such as “psychological” or “non-pharmacological”, “treatments” or “therapy”, and “insomnia” for studies published up till December 2012. References in selected articles were also searched. Sixty-nine studies of psychological treatment for insomnia were reviewed. The treatment components described in these studies were classified according to insomnia aetiology theories described in the literature.

Results**:** Of the treatment packages reviewed, only 9% targeted all four areas. The behavioural aspects of sleep and physiological arousal in anxiety were most frequently included in treatment packages (82% and 51%, respectively), while sleep- or insomnia-related cognitions were targeted in just over one-third of studies examined. Anxiety-related cognitions were targeted in only 19% of studies.

Conclusions**:** In order to bridge the gap between insomnia theories and practice, future studies should investigate the efficacy of treatment packages

addressing all aspects of insomnia aetiology, and in particular the key contributing factor of anxiety.

Insomnia treatments: Do existing psychological treatments match current models of insomnia?

Insomnia is broadly defined as a difficulty in initiating or maintaining sleep that is accompanied by a feeling of unrefreshing sleep and impaired daytime functioning. The prevalence of insomnia symptoms in the general population varies according to the criteria used, ranging from 7% using strict diagnostic criteria (Ohayon & Roth, 2003) to about 33% using less stringent criteria (Ohayon, 2002). Insomnia complaints, however, go largely untreated (Léger & Bayon, 2010) despite the negative impact on quality of life (Léger & Bayon, 2010), health (Daley, Morin, LeBlanc, Gregoire, Savard, et al., 2009; Novak, Mucsi, Shapiro, Rethelyi, & Kopp, 2004), daytime functioning (Riedel & Lichstein, 2000), work (Daley, Morin, LeBlanc, Gregoire, Savard, et al., 2009; Léger & Bayon, 2010), and societal costs (Daley, Morin, LeBlanc, Gregoire, & Savard, 2009; Léger & Bayon, 2010; Scott, Scott, O'Keeffe, & Gander, 2011). The last few decades have seen a great advance in the psychological treatment of insomnia, from the initial behaviourally-focussed stimulus control, sleep restriction, and relaxation techniques, to the more recent addition of cognitive strategies (e.g., Harvey, Sharpley, Ree, Stinson, & Clark, 2007; Morin, Blais, & Savard, 2002; Spielman, Saskin, & Thorpy, 1987). A growing body of literature has pointed to the role of hyperarousal/de-arousal inhibition and, possibly, anxiety in the development and maintenance of insomnia (LeBlanc et al., 2009; Ohayon & Roth, 2001).

The first part of this article will begin by examining the aetiological theories of insomnia to establish the common denominators across these theories. Insomnia treatments have been available for a number of years and

their efficacy is well established (Morin et al., 2006; Murtagh & Greenwood, 1995). However, the second part of this article will examine the components of existing psychological treatments for insomnia to identify whether they target the full range of causal and maintaining factors described in the first part of this article. Issues regarding the variety of insomnia complaints and presentations will also be discussed.

Insomnia

There are different classifications and definitions of insomnia. The *Diagnostic and Statistical Manual of Mental Disorder-4th Edition-Text Revision* (DSM-IV-TR; American Psychiatric Association, 2000) classifies sleep disorders according to aetiology; the diagnosis of Primary Insomnia is made when other causes for sleep difficulties have been ruled out. The *International Classification of Sleep Disorders-Revised* (ICSD-R; American Sleep Disorders Association, 1997) has a different classification system that specifies arousal as a diagnostic criterion for Psychophysiological Insomnia and distinguishes between insomnia subtypes and other sleep disorders. Finally, the *International Classification of Diseases–10th Edition* (ICD-10; World Health Organisation, 1992) distinguishes between nonorganic insomnia and nonorganic disorder of the sleep-wake schedule. Moreover, the criteria used in research are often less stringent than diagnostic criteria and involve broader sleep complaints (Mellinger, Balter, & Uhlenhuth, 1985; Ohayon, 2002). Although attempts have been made to develop research diagnostic criteria for insomnia (Edinger et al., 2004), it was found that there is evidence supporting both the DSM-IV-TR and the ICSD-R diagnostic systems. As the DSM-IV-TR definition is based on a broader classification of insomnia and the ICSD-R is classified according to

insomnia subtypes, there is both an overlap and a distinction between the two systems. While this variety may reflect the diversity of insomnia complaints present in the population, unfortunately it may also interfere with research and treatment of insomnia; it makes comparison between (and generalization across) studies more difficult and it also complicates the diagnostic process and consequently treatment choices.

Insomnia as symptom or disorder

Insomnia is part of the diagnostic criteria for several mental illnesses described in the DSM-IV-TR (American Psychiatric Association, 2000). The clinician is therefore faced with the decision of whether insomnia should also be treated. As will be discussed below, even when insomnia is secondary to another disorder, it can take a course of its own and thus warrant specific treatment. Harvey (2001) examined this issue by looking at the relationship between insomnia and mental disorders. More specifically, she investigated whether insomnia can be considered a disorder in itself or only a symptom of mental disorders. Her review concluded that despite the high comorbidity between insomnia and other psychological disorders, a strict distinction between 'primary' vs. 'secondary' insomnia should be questioned given that insomnia was found to be a risk factor for some disorders. In particular, despite insomnia being commonly described as secondary to (a symptom of) depression, evidence indicated that insomnia predicted the course of depression, and persisted once depression was treated (Harvey, 2001). The interaction between insomnia and the co-morbid condition is often bi-directional and not as straightforward as it appears when insomnia is conceptualized as a symptom (Billiard & Bentley, 2004). For instance, insomnia treatment can be effective in reducing mild

depressive symptoms (Billiard & Bentley, 2004; Taylor, Lichstein, Weinstock, Sanford, & Temple, 2007) and combined insomnia treatment and antidepressant drugs are more effective than antidepressants alone (Manber et al., 2008). Insomnia symptoms can also be ameliorated after treatment of other primary conditions (e.g., Generalised Anxiety Disorder; Belanger, Morin, Langlois, & Ladouceur, 2004). Psychological treatments for insomnia have been available for decades and meta-analyses (Murtagh & Greenwood, 1995) and systematic reviews (Morin, et al., 2006) have established their efficacy in the treatment of insomnia. Moreover, psychological and behavioural treatments for insomnia have been found to be more effective than pharmacological treatments in sustaining outcomes in the long-term (Riemann & Perlis, 2009). In sum, it appears that insomnia can be treated with psychological interventions notwithstanding co-morbidity with other mental health conditions. Given this diversity of insomnia definitions, the next section will examined the etiological models of insomnia to identify the commonalities across these models.

Insomnia Models

This section will begin reviewing the earlier behavioural models of insomnia through the later cognitive-behavioural and neurocognitive models. The variety of insomnia definitions highlighted in the previous section appear to be reflected in the models reviewed. These models are not exclusive of one another and newer theories do not necessarily replace older ones. Instead, they appear to conceptualise insomnia from different perspectives, while addressing common factors in insomnia aetiology (see Table 1 below).

Table 1. Factors involved in the development and maintenance of chronic insomnia.

Conceptualization	Specific factors
Predisposing—hyperarousal; anxiety; perfectionism; irregular bedtime schedule; maladaptive stress management; lifestyle factors.	Sleep behaviours—excessive time in bed; increased caffeine intake; effort to sleep; monitoring (clock watching; signs of impending sleep); safety behaviours (cancelling appointments; napping); attentional bias (looking for daytime deficits).
Precipitating—acute stressors (e.g. arrival of baby, different bedroom environment, retirement).	Sleep cognitions—misconceptions about causes and consequences of insomnia; unrealistic idea of 'normal' sleep.
Perpetuating—negative sleep cognitions; misperception of daytime deficits; selective attention; monitoring; safety behaviours; maladaptive coping strategies; effort to try to sleep; lifestyle factors.	Somatic arousal—increased sensitivity to stress; tension; restlessness.
	Cognitive arousal—worry and anxiety.

One of the earlier models of insomnia development was initially described by Spielman and Glovinsky (1991) and more recently by Yang, Spielman and Glovinsky (2006) in terms of its *predisposing*, *precipitating* and *perpetuating* factors. Known as the "3P" model of insomnia, it highlights that precipitating events lead to short-term insomnia. However, it is the perpetuating factors that are mainly involved in chronic insomnia. Some individuals are more likely to suffer from insomnia if they have predisposing

characteristics such as anxious personality traits or high levels of baseline arousal states. Short-term or transient insomnia takes place when a precipitating event (such as a new role at work) leads to sleepless nights. Chronic insomnia develops when maladaptive attempts (e.g., daytime napping and excessive time in bed) are made to cope with the acute stressor, and when there is use of bed and bedroom for sleep-incompatible behaviours (such as worrying about problems or working in the bedroom). Over time, these perpetuating factors facilitate the conditioning of bed with arousal and become the maintaining factors in chronic insomnia, long after the original stressor is gone (Spielman & Glovinsky, 1991).

Although initially the focus was on maladaptive behaviours influencing insomnia, the role of cognitions has later received attention from clinicians and researchers. Misconceptions about sleep and the consequences of insomnia in the course of chronic insomnia have been the focus of extensive research by Morin and colleagues. In particular, beliefs around the control and predictability of sleep, and the consequences of insomnia are distinguishing features amongst people with insomnia (Carney & Edinger, 2006; Morin & Espie, 2003; Morin, Stone, Trinkle, Mercer, & Remsberg, 1993). Additionally, worry about sleep was found to develop in the course of chronic insomnia (i.e., it is not a significant factor in short-term insomnia) and it accounted for a significant proportion of variance in sleep onset latency and, to a lesser extent, wake after sleep onset and total sleep time (Jansson & Linton, 2006a). Harvey (2002a, 2005) highlighted that daytime events also have a role in the maintenance of insomnia; worry about daytime deficits, attentional bias towards possible deficits, monitoring for sleep-related threats (e.g., indicators of

poor sleep or bodily sensations) and performing safety-seeking behaviours during the day (such as cancelling appointments or taking naps) contribute to insomnia maintenance—they prevent disconfirmation of unhelpful beliefs, increase anxiety and arousal and delay sleep onset. In turn, the increased anxious state and counterproductive coping strategies lead to a greater sleep loss and daytime performance deficits (Harvey, 2002a, 2005). Besides, the more dysfunctional beliefs a person presents with, the more safety behaviours they will perform (Woodley & Smith, 2006), thus forming a vicious cycle that culminates in chronic insomnia.

In addition to worry about sleep, general cognitive arousal also has implications for the development and maintenance of insomnia. For instance, it has been found that people with insomnia are less efficient in dealing with pre-sleep cognitive arousal and that increased anxiety during novel situations predicted delayed sleep-onset and sleep quality (Belanger, Morin, Gendron, & Blais, 2005; Waters, Adams, Binks, & Varnado, 1993). Insomnia has also been linked with different coping styles in the face of stressful events or potentially threatening situations. More specifically, people with insomnia use less adaptive strategies in the face of an uncontrollable situation, such as using emotion-based strategies instead of problem-solving strategies (Morin, Rodrigue, & Ivers, 2003). Similarly, Voss, Kolling and Heidenreich (2006) found that both people with anxiety and people with insomnia resorted more often to monitoring coping strategies (e.g., information seeking), whereas good sleepers resorted more frequently to blunting strategies (e.g., distraction or reappraisal of situation). Adding to Harvey's (2002a, 2005) cognitive insomnia model, it seems that the overall anxious tendency of people with insomnia applies not

only to sleep-related threats, but also to any potentially dangerous or stressful situations. People with insomnia are likely to worry and perform safety-seeking and avoidant behaviours in relation to events other than just sleep.

There has also been an increase in focus on physiological aspects involved in insomnia. Lundh and Broman (2000) formulated an insomnia model that integrates psychological, physiological and behavioural processes in the development and maintenance of insomnia. According to Lundh and Broman, insomnia develops as a result of the interaction between *sleep-interfering* and *sleep-interpreting* processes in vulnerable individuals. In other words, a number of factors predispose certain individuals to become more aroused (cognitively, emotionally or physiologically) during the day and/or night time, and this arousal leads to disrupted sleep. People with insomnia may also respond more intensively to a novel or stressful situation and may take longer for arousal levels to return to baseline (*sleep-interfering* processes). In addition, people with chronic insomnia may also develop certain beliefs and attributions about sleep, insomnia and its consequences, and this interpretation may give way to real sleep deficits (*sleep-interpreting* processes; it has been widely demonstrated that in insomnia there is a discrepancy between people's subjective and objective records of sleep hours). This model matches closely with Morin's (1993, 2006) and Harvey's (2002a, 2005) cognitive models. Furthermore, Lundh and Broman identified a personality characteristic—perfectionism—that may predispose a person to such interpretation biases. Excessively high performance standards may lead, on the one hand, to the development of unrealistic expectations and, on the other hand, to interpretive biases that magnify the extent of deficits after a poor night of sleep. This would

increase the level of arousal (and distress) and, as a result, they might spend more time on activities or refuse to ask for help, in order to maintain their current expected level of functioning despite feeling tired. Finally, the insomnia complaint would be exacerbated by the resulting anxiety, hyperarousal, reduced sleep opportunity and real sleep deficits.

From a neurocognitive perspective, Espie (2002, 2007) and colleagues (Espie et al., 2006) proposed that psychophysiological insomnia takes place when the de-arousal processes that would allow sleep to happen are somehow inhibited. This model is based on the premise that psychophysiological insomnia is a deviation from a normal sleep process and is described as the *attention-intention-effort pathway* to insomnia. Alongside the homeostatic and circadian factors that regulate sleep, Espie at al. described an 'automatic' component to sleep: with all the conditions being met (e.g., tiredness, appropriate environment), sleep just happens "without a consciously explicit plan" (p.216). They propose that it is this third, automatic process that is involved in the development of psychophysiological insomnia. That is, instead of 'switching off' and allowing oneself to be overcome by sleep, a person would actively search for sleep threats and cues (attention), would explicitly intend to sleep (intention) and would make an effort to try to sleep (effort), in an attempt to control this otherwise involuntary process. As a result, the level of arousal increases and sleep is inhibited and postponed.

Finally, chronic insomnia has been linked with higher stress system activity as indicated by increase in urine cortisol and catecholamine levels (Vgontzas et al., 1998) and arousal of the autonomic nervous system (Waters et al., 1993). People with chronic insomnia also seem to have cortical hyperarousal

in addition to physiological and cognitive arousals, and this hyperaroused state is present throughout the day and not only at sleep time (Cortoos, Verstraeten, & Cluydts, 2006). Ohayon and Roth (2001) reported that hyperarousal—defined as mind racing with preoccupations, anxiety, and/or worries in bed—was present in 63% of people with chronic insomnia without mental disorders. (In people with insomnia and mental disorders, 95% reported hyperarousal.) People with chronic insomnia also present with high cognitive arousal at bedtime, irrespective of presence of Generalized Anxiety Disorder and severity of insomnia (Belanger et al., 2005). Moreover, a prospective study found a lower arousal threshold and higher levels of depressive and anxiety symptoms amongst the new cases of insomnia, providing further support for the hypothesis of arousal as a predisposing factor in insomnia. This study also found that these features became worse before or during onset of insomnia, which highlights their role also as precipitating factors (LeBlanc et al., 2009). While these studies do not attempt to develop a model of insomnia, they nonetheless provide further evidence of the involvement of cognitive, physiological and cortical arousal in insomnia.

While there are a variety of models of insomnia, there seems to be a consensus on the role of a combination of behavioural, psychological and physiological factors involved in the development and maintenance of insomnia. A summary of these factors are displayed in Table 1 (page 11). The “3P” model gives a framework to look for a range of potential maintaining factors and it can be used for both primary and secondary insomnia, thus highlighting that both conditions could be treated. Also, although this model was initially used in the behavioural context—that is, the conditioned arousal between bed/bedroom and

sleep—it was also helpful in accommodating the role of additional factors as they are described in the literature (such as dysfunctional sleep cognitions). Morin's (1993) research on sleep-related cognitions underscored the role of beliefs in the development of insomnia and Harvey (2002a, 2005) drew attention to daytime cognitions and behaviours in addition to the night/bedtime factors involved in insomnia. Lundh and Broman's (2000) model, despite drawing on similar theories of arousal and cognitions in insomnia, described a personality trait of perfectionism as an important predisposing factor in the development of insomnia. Interference with a normal sleep process is also suggested by Espie (2002, 2007) and colleagues (Espie et al., 2006) whereby selective attention and efforts and intention to go to sleep have a counterproductive effect and instead increase arousal and delay sleep. This model, as well as Lundh and Bronan's (2000) model, explicitly suggest that insomnia is an obstruction of a normal sleep process instead of a pathological condition.

Although the actual causal mechanisms are not yet entirely established, taken together the studies point to a stress-vulnerability model coupled with maladaptive coping strategies as the major factors involved in insomnia aetiology. In regards to anxiety, evidence indicates that sleep-related anxiety results from chronic insomnia whereas general anxiety (i.e., the emotional experience associated with threat-oriented thoughts that are distressing and physiologically arousing in nature, and that are associated with avoidance or other safety-seeking behaviours) is associated with the onset of insomnia.

This section showed that despite the diversity of insomnia models, there appears to be common factors that are involved in the development and

maintenance of insomnia: dysfunctional sleep behaviours and cognitions and cognitive and physiological arousal. The next section will describe the method and results for the second part of this article. The results section begins with a brief description of the most commonly used interventions for insomnia and then examines psychological treatments of insomnia and identify whether they target the full range of causal and maintaining factors of insomnia described above.

Method

Databases (PsycINFO, Psychology and Behavioural Sciences Collection, Medline, and Google Scholar) were searched using terms such as "psychological" or "non-pharmacological", "treatments" or "therapy", and "insomnia", for studies published up till December 2012. References in selected articles were also searched. Sixty-nine studies of psychological treatment for insomnia were reviewed. The treatment components described in these studies were classified according to insomnia aetiology theories described in the literature. See supplementary material at the end of this article for a summary of the studies identified.

Results

Behavioural Treatments

Stimulus control (Bootzin, Epstein, & Wood, 1991) has been designed based on behavioural models of insomnia, and aims to recondition bed and bedroom with sleep. There has been a great amount of research demonstrating its efficacy both as a standalone treatment (Morin & Azrin, 1987) and as part of a treatment package (Murtagh & Greenwood, 1995).

Sleep hygiene (Kleitman, 1987) is a set of guidelines involving lifestyle factors and behaviours that interfere with sleep, such as avoiding alcohol and caffeine in the evenings, avoiding monitoring the clock or keeping regular wake times. Although on its own sleep hygiene does not produce great benefits (Stepanski & Wyatt, 2003), it is still widely used in conjunction with other interventions (Espie et al., 2007; Morin, Kowatch, Barry, & Walton, 1993) and there is evidence for efficacy of some of its components (e.g., caffeine abstinence; Sin, Ho, & Chung, 2009).

Another behavioural technique, *sleep restriction* (Spielman et al., 1987), involves restricting time spent in bed to maximize sleep efficiency (an index of time asleep / time spent in bed) in order to avoid excessive time awake in bed. Additionally, this procedure induces a state of mild sleep deprivation that would facilitate sleep onset and promote a regular sleep-wake schedule. Sleep restriction is also used as part of cognitive-behavioural treatment packages (Espie et al., 2007) and there is evidence of its efficacy on its own (Spielman et al., 1987).

Various types of *relaxation exercises* have also been widely used to treat insomnia by reducing both cognitive (e.g. imagery training; Morin & Azrin, 1987) and physiological arousal (e.g. progressive muscle relaxation; Espie, Lindsay, Brooks, Hood, & Turvey, 1989).

Cognitive or Cognitive-Behavioural Treatments

Following the addition of cognitive aspects to the theories of insomnia maintenance, *cognitive interventions* have been added to the behavioural components of insomnia treatments. A meta-analysis demonstrated the efficacy of cognitive-behavioural therapy for insomnia (Murtagh & Greenwood, 1995), as

did a more recent review by Morin et al. (2006). This approach has been shown to be effective in improving sleep in older adults (Morin, Kowatch, et al., 1993) and in the primary care practice (Espie, Inglis, Tessier, & Harvey, 2001; Espie et al., 2007). Typically, the cognitive content of the therapy is delivered in just one session, addressing dysfunctional beliefs and attitudes about sleep, insomnia and its consequences (Morin, 1993). Harvey, Sharpley, Ree, Stinson and Clark (2007) likewise reported significant improvement in sleep in people with chronic insomnia following cognitive therapy that targeted the perpetuating factors described in Harvey (2002a). These improvements were sustained at a 12-month follow-up assessment. The cognitive content of sessions was substantially greater than in the usual insomnia CBT treatments, averaging 14 sessions (Harvey et al., 2007).

Coverage of model components

The majority of treatment packages examined targeted behaviours and cognitions specifically related to sleep and physiological arousal, either alone or in combination. The most common combination of treatments was sleep-related behaviours and cognitions, followed by sleep-related behaviours and cognitions and physiological arousal. The most common single treatment target was sleep behaviours.

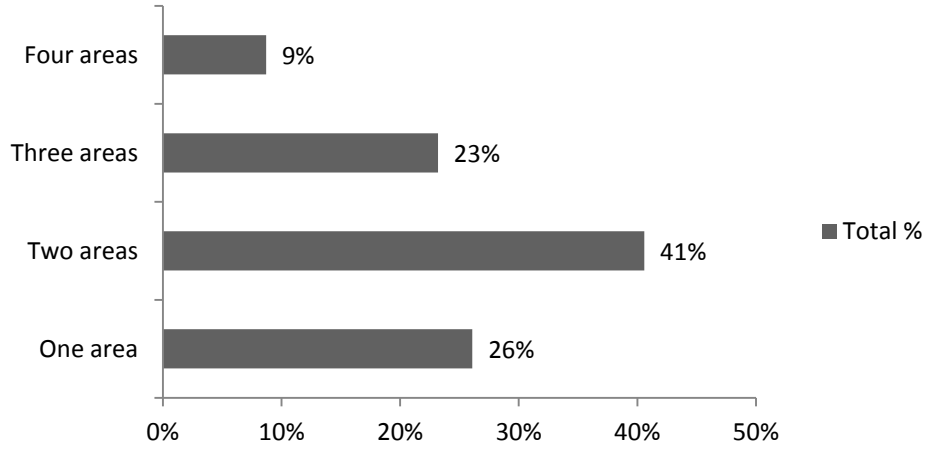

Figure 1. Percentage of studies targeting areas involved in insomnia etiology.

Figure 1 shows the studies according to percentage of areas targeted in the different treatment packages. Most treatments targeted one to three components only while few studies targeted all four. In addition, Table 2 shows that behavioural aspects of sleep and anxiety are most commonly targeted, followed by sleep cognitions. Anxious cognitions were seldom addressed in insomnia treatment packages and studies varied in therapeutic technique (e.g., imagery relaxation, stress and intrusive thoughts management). In other words, while *perpetuating factors* have been more thoroughly targeted in insomnia treatments, *predisposing factors* have only been partially addressed. A few notable exceptions devoted time to anxiety-related cognitions. Jansson and Linton (2005) focused on daytime deficits and strategies to manage the related stress and also targeted worry by using distracting techniques or worry scheduling. Their psychoeducation session also involved information about the role of arousal in sleep. The CBT package described in Espie et al. (2001) was designed to be implemented in general medical practice and administered by nurses; it devoted two sessions to cognitive strategies that included thought restructuring and anxiety and worry management. Ong, Shapiro and Manber

(2008) combined CBT and mindfulness to target physiological and cognitive arousal using meditation. Main effects were found on pre-sleep arousal only (and not overall hyperarousal) but his package did not include the use of cognitive strategies about sleep.

Table 2. Percentage of studies including cognitive and behavioural interventions for sleep and anxiety in insomnia (n = 69).

Intervention	Focus	
	Sleep	Anxiety
Behavioural	82%	51%
Cognitive	34%	19%

Conclusions

Insomnia is a condition that affects a large number of people and has negative consequences for people's quality of life. It is also a risk factor for depression. Untreated insomnia can be very costly to the health system. Insomnia can present in a variety of ways and a detailed diagnostic interview is necessary to ensure appropriate treatment. While many people with insomnia rely on long-term use of sleep medications, psychological treatments are also effective for insomnia, especially in the long-term, where they seem to be more effective than pharmacological treatment. Current research has shown that several factors are involved in the development of chronic insomnia. There is a consensus that maladaptive behaviours and dysfunctional sleep cognitions are

significant contributors to insomnia and these are usually targeted in psychological treatment packages. More recently, the interest in the role of anxiety traits has led to the addition of strategies to manage worry and anxiety in the treatment of insomnia.

The current review showed that with a few exceptions, the focus has been mostly on sleep related anxiety or on the behavioural aspects of anxiety treatment (e.g., relaxation). Research clearly indicates that worry and anxiety about other situations also have a negative impact on sleep, and yet this area is seldom included as part of insomnia treatments. When cognitive arousal was targeted, with few exceptions, it was mainly through imagery relaxation. This narrative review did not examine the literature in a systematic manner, and the methodology could be improved by the use of a standardised instrument to compare the studies examined. Nonetheless, it did provide enough evidence that insomnia treatment packages do not appear to be targeting the full causal and maintaining factors of insomnia difficulties. Treatment packages should incorporate interventions for all factors that are involved in the development and maintenance of chronic insomnia. Future studies should investigate the efficacy of these treatment packages and examine the differential effects of the addition of a more thorough anxiety treatment in the context of insomnia complaints.

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DRC 16

MASSEY UNIVERSITY
GRADUATE RESEARCH SCHOOL

STATEMENT OF CONTRIBUTION
TO DOCTORAL THESIS CONTAINING PUBLICATIONS

(To appear at the end of each thesis chapter/section/appendix submitted as an article/paper or collected as an appendix at the end of the thesis)

We, the candidate and the candidate's Principal Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of Candidate: Fernanda de Lacerda Mottin

Name/Title of Principal Supervisor: Dr Duncan Babbage

Name of Published Research Output and full reference:

de Lacerda Mottin, F. and Babbage, D. R. (Manuscript being prepared for submission.) Insomnia aetiology and psychological treatments.

In which Chapter is the Published Work: Chapter Two

Please indicate either:

- The percentage of the Published Work that was contributed by the candidate:

  and / or

- Describe the contribution that the candidate has made to the Published Work:

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GRS Version 3– 16 September 2011

Insomnia treatments: Do existing psychological treatments match current models of insomnia?

Supplemental Material

Treatments targeting one area				
Authors	**Diagnostic population**	**Parameters**	**Components**	**Target**
Biancosino et al. (2006)	Insomnia in patients with severe mental illness	Group; 2 sessions (60 minutes); 3 months	Psychoeducation; sleep hygiene; stimulus control	Sleep behaviours
Carrera & Elenewski (1980)	Insomnia	Individual; 45 minutes tape; no FU	Implosive therapy	Cognitive arousal
Edinger & Sampson (2003)	Primary insomnia in primary care	Individual; 2 sessions in 4 weeks (25 minutes); 3 months	Combined sleep restriction and stimulus control; sleep information	Sleep behaviours
Edinger et al. (2009)	Primary or co-morbid insomnia	Individual; 4 bi-weekly sessions (30-60 minutes); 6 months	CBT (psychoeducation; stimulus control; sleep restriction)	Sleep behaviours

Edinger, Wohlgenmuth, Radtke, Marsh, & Quillian (2001)	Chronic primary insomnia	Individual; 6 weeks (30-60 minutes); 6 months	CBT (psychoeducation; stimulus control; sleep restriction) *or* relaxation training (PMR)	Sleep behaviours *or* somatic arousal
Espie, Lindsay, Brooks, Hood, & Turvey (1989)	Chronic and primary insomnia	Individual; 8 weeks (NA); 6 weeks, 3, 6 and 17 months	PMR *or* Stimulus control *or* Paradoxical intention	Autonomic arousal *or* sleep behaviours;
Friedman et al. (2000)	Older adults with insomnia	Individual; 4 weeks (NA); 3months	Sleep restriction *or* sleep restriction plus nap	Sleep behaviours
Gustafson (1992)	Insomnia	Group (3-4 people); NA; 12 months	Sleep and relaxation information and PMR	Somatic arousal
Harris, Lack, Kemp, Wright,	Chronic sleep-onset	Individual; 2 nights and 5	Intensive sleep retraining *or*	Sleep behaviours

& Bootzin (2012)	insomnia	weeks	stimulus control *or* Intensive sleep retraining and stimulus control *or* sleep hygiene	
Harris, Lack, Wright, Gradisar, & Brooks (2007)	Chronic primary insomnia	Individual; 2 nights; 6 weeks	Intensive sleep retraining (modified sleep restriction: one night of sleep deprivation—subjects woken 3minutes after falling asleep throughout the night)	Sleep behaviours
Lichstein, Riedel, Wilson, Lester, & Aguillard (2001)	Older adults with insomnia	Individual; 6weeks (45minutes)	Sleep restriction *or* relaxation	Sleep behaviours *or* somatic arousal
Means,	Primary	Individual;	Progressive	Somatic

Lichstein, Eperson, & Johnson (2000)	insomnia	3 sessions (15-20 minutes); no follow-up	relaxation	arousal
Morin & Azrin (1987)	Sleep-maintenance insomnia	Group (3-5 people); 4 week (1 hour); 3 and 12 months	Stimulus control *or* imagery training	Sleep behaviours *or* cognitive arousal
Morin & Azrin (1988)	Sleep-maintenance insomnia in older people	Group (3-5 people); 6 sessions (60-75 minutes); 3 and 12 months	Stimulus control *or* imagery training	Sleep behaviours *or* cognitive arousal
Riley, Mihm, Behar, & Morin (2010)	Adults with chronic insomnia	individual; 6 weeks (NA); 6 weeks	Stimulus control and sleep restriction (PMR and cognitive restructuring information provided in	Sleep behaviours (sleep cognitions and somatic arousal

			writing but not actively monitored)	not actively targeted by clinician)
Spielman, Saskin, & Thorpy (1987)	Range of insomnia diagnosis	Individual; 8 weeks (NA); mean 36 weeks	Sleep restriction; no napping	Sleep behaviours
Woolfolk & McNulty (1983)	Sleep-onset insomnia	Individual; 4 weeks; 6 months	Imagery training *or* imagery training with muscle-tension release *or* somatic focusing training *or* progressive relaxation training	Somatic arousal *or* cognitive arousal
Zwart & Lisman (1979)	Sleep-onset insomnia	Group (7-9 people); 4 weeks (30 minutes); 4	Stimulus control	Sleep behaviours

		weeks		
Treatments targeting two areas				
Authors	**Diagnostic population**	**Parameters**	**Components**	**Target**
Archer, Brown, Idusohan, Coventry, Manoharan, & Espie (2009)	Men with insomnia	Group workshop; 1 day (7 hrs); 6 weeks	CBT (sleep information and CBT insomnia model; sleep hygiene; sleep restriction; stimulus control; sleep thoughts)	Sleep behaviours and cognitions
Arnedt et al. (2007)	Insomnia comorbid with alcohol dependence	Individual; 8 weeks; no FU	Sleep restriction, stimulus control, sleep hygiene, cognitive strategies, and sleep maintenance/relapse prevention as well as education regarding the	Sleep behaviours and cognitions

			role of alcohol in precipitating and maintaining insomnia	
Bastien, Morin, Ouellet, Blais, & Bouchard (2004)	Chronic insomnia	Individual (50 minutes) vs. group (4-6 people, 90 minutes) vs. telephone (20 minutes); 8 weeks; 3 and 6 months	CBT (stimulus control; sleep restriction; cognitive restructuring; sleep hygiene)	Sleep behaviours and cognitions
Bliwise, Friedman, Nekich, & Yesavage (1995)	Elderly people with insomnia	Individual; 4 weeks plus one wrap-up session; 3 months	Sleep restriction and relaxation training	Sleep behaviours and somatic arousal
Chambers & Alexander (1992)	Chronic insomnia	single session (2-3 hours) and up to 1-3 follow-up sessions	Stimulus control; sleep restriction; sleep hygiene; cognitive restructuring	Sleep behaviours and cognitions

Espie, Brooks, & Lindsay (1989)	Chronic insomnia	Individual; 8 weeks; no follow-up	Tailored vs. random treatment (combined progressive relaxation, paradoxical intention and stimulus control)	Sleep behaviours and somatic arousal
Gellis & Gehrman (2011)	Veterans with Insomnia comorbid with PTSD	5 weeks; no follow-up	CBT (stimulus control; sleep hygiene; sleep compression; relaxation)	Sleep behaviours and somatic arousal
Goodie, Isler, Hunter, & Peterson (2009)	Chronic insomnia	Individual; 3-4 sessions (15-30 minutes); no follow-up	Sleep hygiene; stimulus control; sleep restriction; relaxation (deep breathing, passive muscle relaxation; to some patients only); self-help book	Sleep behaviours and somatic arousal

Harvey, Sharpley, Ree, Stinson, & Clark (2007)	Primary chronic insomnia	Individual; 6-22 (NA); 3, 6, and 12 months	Cognitive therapy (cognitive restructuring; guided discovery; behavioural experiments)	Sleep behaviours and cognitions
Jacobs, Rosenberg, Friedman, & Matheson (1993)	Chronic insomnia	Individual; 10 weeks (30 and 25 minutes); 1 month	Sleep hygiene; stimulus control; relaxation training	Sleep behaviours and somatic arousal
Jansson-Fröj mark, Lind, & Sunnhed (2012)	Primary insomnia	4 sessions (2 hrs; then 30 minutes); 2 weeks	Behaviour therapy (stimulus control; sleep restriction) and constructive worry *or* behaviour therapy only	Sleep behaviours and cognitive arousal
Kupych-Woloshyn, MacFarlane, & Shapiro (1993)	Chronic primary insomnia	Group; 8 weeks (1 hour); no follow-up	Stimulus control, sleep restriction; relaxation techniques; psychoeducation;	Sleep behaviours and somatic

			lifestyle management	arousal
Lichstein, Wilson, & Johnson (2000)	Secondary insomnia (psychiatric and medical)	Individual; 4 weeks (1 hour); 3 months	Sleep hygiene; stimulus control; relaxation	Sleep behaviours and somatic arousal
Maroti, Folkeson, Jansson-Fröjmark, & Linton (2011)	Insomnia comorbid with anxiety and depression	Individual; 6 weekly plus one booster session (60-90 minutes); 3 weeks	CBT (Psychoeducation; sleep hygiene; sleep restriction; stimulus control; cognitive restructuring; relapse prevention))	Sleep behaviours and cognitions
Morgan, Gregory, Tomeny, David, & Gascoigne (2012)	Insomnia symptoms comorbid with chronic conditions in older adults	Self-help; 6 weeks; 3 and 6 months	CBT (psychoeducation; sleep hygiene; stimulus control; cognitive restructuring; relapse	Sleep behaviours and cognitions

			prevention)	
Morin, Blais, & Savard (2002)	Older adults with chronic and primary insomnia	Group; 8 weeks (NA); 3, 12 and 24 months	CBT (stimulus control; sleep restriction; sleep hygiene; cognitive restructuring)	Sleep behaviours and cognitions
Morin, Kowatch, Barry, & Walton (1993)	Chronic sleep-maintenance insomnia in older adults	Group (4-6people); 8weeks (90 minutes); 3 and 12 months	CBT (sleep restriction; stimulus control; cognitive restructuring; sleep hygiene)	Sleep behaviours and cognitions
Morin, Stone, McDonald, & Jones (1994)	Psychophysiological insomnia or secondary insomnia	Individual; 8-10 sessions; no follow-up	Sleep restriction; stimulus control; cognitive restructuring; sleep hygiene; medication withdrawal(optional)	Sleep behaviours and cognitions
Ritterband et al. (2012)	Cancer survivors	Internet; 9 weeks; no	CBT (psychoeducation	Sleep behaviours

	with insomnia	follow-up	; sleep hygiene; sleep restriction; stimulus control; cognitive restructuring; relapse prevention)	and cognitions
Ritterband et al. (2009)	Chronic primary insomnia	Internet; 9weeks; 6months	CBT (psychoeducation ; sleep restriction; stimulus control; cognitive restructuring; sleep hygiene; relapse prevention)	Sleep behaviours and cognitions
Soeffing et al. (2008)	Insomnia in hypnotic-dependant older adults	Individual; 8 sessions (60minutes);	Relaxation; stimulus control; sleep hygiene	Sleep behaviours and somatic arousal
Stam & Bultz	Severe insomnia in a	Individual; 5 sessions; 1	PRM and	Cognitive and

(1986)	patient with cancer	year	imagery training	somatic arousal
Ström, Pettersson, & Andersson (2004)	Insomnia	Internet; 5 weeks; no FU	CBT (Sleep restriction; Stimulus control; cognitive restructuring)	Sleep behaviours and cognitions
Tang (2010)	Insomnia comorbid with social phobia	Individual; 5 sessions (60 minutes) plus one booster session; 9 months	CBT (psychoeducation ; sleep restriction; stimulus control; cognitive restructuring)	Sleep behaviours and cognitions
Tang, Goodchild, & Salkovskis (2012)	Insomnia comorbid with chronic pain	Individual; 4 sessions (2 hrs); 1 and 4months	CBT (psychoeducation ; sleep restriction; stimulus control; cognitive restructuring)	Sleep behaviours and cognitions
Thorndike et al. (2008)	Insomnia	Internet delivered; 6	CBT (psychoeducation	Sleep behaviours

		weekly cores; no FU	; sleep hygiene; sleep restriction; stimulus control; cognitive restructuring; relapse prevention)	and cognitions
Viens, De Koninck, Mercier, St-Onge, & Lorrain (2003)	Sleep-onset insomnia and high trait anxiety	Individual; 9 weeks (NA); no follow-up	Anxiety management training (deep muscle relaxation, visualisation)	Cognitive and somatic arousal
Wickwire, Schumacher, & Clarke (2009)	Primary insomnia	Individual; 4 weeks; 1 month	Pre-sleep routine (stimulus control and relaxation)	Sleep behaviours and somatic arousal
Treatments targeting three areas				
Authors	**Diagnostic population**	**Parameters [1]**	**Components**	**Target**
Davidson, Waisberg,	Insomnia in cancer	Group (4-6people);	Psychoeducation; stimulus control;	Sleep behaviours

Brundage, & MaClean (2001)	patients	6 sessions(60-90minutes); no follow-up	relaxation (abdominal breathing, PRM and imagery); worry time; relapse prevention	; cognitive and somatic arousal
Dolan, Taylor, Bramoweth, & Rosenthal (2010)	Chronic insomnia with co-morbid disorders and using sleep medication	Individual; 8 sessions (60 minutes); no follow-up	CBT (sleep hygiene, relaxation, stimulus control, sleep restriction, cognitive restructuring, relapse prevention)	Sleep behaviours and cognitions ; somatic arousal
Dopke, Lehner, & Wells (2004)	Insomnia and serious mental illness	Group (6 & 4 people); 10 sessions (50 minutes); no follow-up	CBT (Psychoeducation; stimulus control; sleep restriction; cognitive and somatic	Sleep behaviours ; cognitive and somatic arousal

			relaxation)	
Edinger, Hoelscher, Marsh, Lipper, & Ionescu-Pioggia (1992)	Older adults with sleep-maintenance insomnia	individual; 8 sessions (45-60 minutes); 3 months	PRM followed by CBT (psychoeducation ; stimulus control; sleep restriction; cognitive restructuring)	Sleep behaviours ; cognitive and somatic arousal
Espie, et al. (2007)	Chronic insomnia	Group (4-6 people); 5 weeks (1 hour); 6 months	CBT (psychoeducation ; sleep hygiene; relaxation; sleep restriction; stimulus control; cognitive restructuring; relapse prevention)	Sleep behaviours and cognitions ; some focus on somatic arousal
Manber, Edinger, Gress, San Pedro-Salcedo, Kuo,	Co-morbid insomnia and Major Depressive	Individual; 7 sessions over 12 weeks (NA);	Antidepressant and CBT (psychoeducation ; sleep restriction;	Sleep behaviours and cognitions ; somatic

& Kalista (2008)	Disorder	no follow-up	stimulus control; stress and arousal management; cognitive restructuring; relapse prevention)	arousal
Ong, Shapiro, & Manber (2008)	Psychophysiological insomnia	Group (7-8 people); 6 weeks (90-120minutes); no follow-up	Mindfulness meditation and CBT (sleep restriction; stimulus control; sleep hygiene; sleep education)	Sleep behaviours; somatic and cognitive arousal
Oosterhuis & Klip (1997)	Sleeping problems	Television and radio broadcast; 8 & 9 sessions respectively (15minutes and NA); 4.5 months	Psychoeducation; PMR and breathing; cognitive restructuring and thought stopping	Sleep behaviours and cognitions; somatic arousal
Perlman,	Veterans with	Group(4-6	CBT (sleep	Sleep

Arnedt, Earnheart, Gorman, & Shirley (2008)	co-morbid psychiatric disorder and chronic insomnia	people); 8-10 weeks (75 minutes); no follow-up	restriction; stimulus control; cognitive restructuring; Sleep hygiene; relaxation training (discussed only when arousal complaints were present but practice not monitored); consolidation and relapse prevention)	behaviours and cognitions ; some focus on somatic arousal
Roane, Dolan, Bramoweth, Rosenthal, & Taylor (2012)	Insomnia (treatment chart review)	Individual; 3 sessions (1 hour);	CBT (sleep restriction, stimulus control, sleep hygiene, relaxation training, cognitive restructuring,	Sleep behaviour and cognitions ; somatic arousal

			and relapse prevention)	
Rybarczyk, Stepanski, Fogg, Barry, Lopez, & Davis (2005)	Older adults with insomnia and medical conditions	Group; 8 weeks (2 hours); no follow-up	CBT (stimulus control; sleep restriction; cognitive restructuring; relaxation training; sleep hygiene)	Sleep behaviours and cognitions ; somatic arousal
Sivertsen, Omvik, Pallesen, Bjorvatn, Havik, Kvale, Nielsen, & Nordhus (2006)	Chronic primary insomnia in older adults	Individual; 6 weeks (50 minutes); 6 months	Medication (Zoplicone) vs. CBT (Sleep hygiene; stimulus control; sleep restriction; cognitive restructuring; PMR)	Sleep behaviours and cognitions ; somatic arousal
Taylor, Lichstein, Weinstock, Sanford, &	Insomnia and mild depression	Individual; 6 weeks (30-60 minutes); 3 months	CBT (sleep hygiene; Stimulus control; PMR; informal cognitive	Sleep behaviours mostly; some focus on

Temple (2007)			restructuring)	sleep cognitions ; somatic arousal
Verbeek, Konings, Aldenkamp, Declerck, & Klip (2006)	Chronic Primary and Secondary Insomnia (individual treatment was only primary insomnia)	Individual and group (5-7 people); 6 weeks (60 minutes individual and 150 minutes group); 1, 4 and 10 months	CBT (Psychoeducation; sleep hygiene; stimulus control; sleep restriction; relaxation exercises; cognitive restructuring; relapse prevention)	Sleep behaviours and cognitions ; somatic arousal
Verbeek, Schreuder, & Declerck (1999)	Primary or secondary insomnia	Individual; 6 sess. (45-60 minutes); no follow-up	Individually tailored. Sleep hygiene; PMR; cognitive restructuring; stimulus control *or* sleep restriction	Sleep behaviours and cognitions ; somatic arousal

Treatments targeting four areas				
Authors	**Diagnostic population**	**Parameters**	**Components**	**Target**
Espie, Inglis, Tessier, Harvey (2001)	Chronic insomnia	Group (4-6 people); 6 weeks (50 minutes); 12 months	CBT (psychoeducation ; sleep hygiene; stimulus control; sleep restriction; relaxation; cognitive restructuring; anxiety and intrusive thoughts management)	Sleep behaviours and cognitions ; some focus on somatic and cognitive arousal
Jansson & Linton (2005)	Early insomnia (3-12 months)	Group (6-10 people); 6 weeks + booster session (2hours); 1 year	CBT (Problem solving; relaxation; paradoxical intention; distraction; worry time; sleep hygiene; stimulus control; sleep	Sleep behaviours and cognitions ; cognitive and somatic arousal

			restriction; cognitive restructuring; stress management; relapse prevention)	
Jansson-Fröjmark et al. (2012)	Insomnia co-morbid with hearing impairment	Individual; 7 weekly sessions (1 hour); 3 months	CBT (Problem solving; relaxation; paradoxical intention; distraction; worry time; sleep hygiene; stimulus control; sleep restriction; cognitive restructuring; stress management; relapse prevention)	Sleep behaviours and cognitions ; cognitive and somatic arousal
Lancee, van	Insomnia	Internet; 6	CBT	Sleep

den Bout, van Straten, & Spoormaker (2012)	disorder	weeks; 4, 18, and 48 weeks	(psychoeducation; sleep hygiene; stimulus control; sleep restriction; cognitive restructuring; PMR; imaginative relaxation; paradoxical intention)	behaviours and cognitions; cognitive ad somatic arousal
Rybarczyk, Lopez, Schelble, & Stepanski (2005)	Comorbid geriatric insomnia	home-based video; 4 tapes fortnightly; 4 months	CBT (stimulus control; sleep restriction; cognitive restructuring; deep breathing; PMR; autogenic training; imagery; sleep hygiene)	Sleep behaviours and cognitions; cognitive and somatic arousal
Rybarczyk, Mack, Harris, & Stepanski	Comorbid and primary insomnia	self-help (book or multimedia);	CBT (stimulus control; sleep restriction;	Sleep behaviours and

(2011)	8 weeks maximum; 1 year	cognitive restructuring; deep breathing; PMR; autogenic training; imagery; sleep hygiene)	cognitions ; cognitive and somatic arousal

Note:

[1] Treatment parameters: modality; duration of treatment (session duration); follow-up period.

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Paper Two

Cognitive-behavioural group therapy for anxiety-related insomnia

Note:

This chapter is presented in a manuscript format and it is intended to submit this manuscript for peer-review and possibly publication. Other manuscripts are referenced as chapters for this thesis only and part of the material in the appendix were included for examination purposes only.

Running head: *Cognitive-behavioural group therapy for anxiety-related insomnia*

Cognitive-behavioural group therapy for anxiety-related insomnia

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Key words: insomnia; sleep; anxiety; arousal; psychological treatments; insomnia; cognitive-behavioural therapy; cognitive therapy; behavioural therapy; CBT; group therapy.

Abstract

Background: Insomnia goes largely untreated despite its negative impact on quality of life, health, work, and societal costs. Despite the high co-occurrence of insomnia and anxiety, anxiety is rarely specifically targeted in insomnia treatments.

Aims: To investigate the effectiveness of a Cognitive-Behavioural group therapy for anxiety and insomnia; to determine whether the order of anxiety and insomnia treatments was influential.

Methods: Twenty-eight participants suffering chronic insomnia and at least subclinical anxiety or stress were randomly assigned to one of two treatment interventions, administered through five treatment groups. Each group had 5-6 participants. Two groups received the *insomnia first* intervention (n = 11) and three groups received the *anxiety first* intervention (n = 17). Within- and between-subjects analyses were performed. Follow-up assessment took place about three months after the end of each treatment group.

Results: At post-treatment the *anxiety first* intervention had significant effects of measures of insomnia severity, $t(497600) = 5.931$, $p < .001$, anxiety, $t(2733997) = 3.690$, $p < .001$, stress, $t(9065296) = 4.297$, $p < .001$, and subjective sleep parameters—time awake after sleep onset, $t(7115544) = 2.648$, $p = .008$, and sleep efficiency, $t(44787) = -3.618$, $p < .001$). The *insomnia first* interventions had significant effects on measure of insomnia severity, $t(28273) = 3.972$, $p < .001$, and stress, $t(22882) = 2.607$, $p = .009$. At follow-up both treatment conditions had large effect sizes on measures of insomnia severity (*insomnia first d* = 3.35; a*nxiety first d* = 1.17) and sleep efficiency (*insomnia*

first d = 1.09; *anxiety first d* = 1.17). However, in examining the outcome trajectories, the anxiety first intervention produced more consistent improvement across the course of the therapy sessions.

Conclusions: Anxiety treatment can be effective in reducing insomnia. The most effective treatment package would specifically address both anxiety and insomnia.

Cognitive-behavioural group therapy for anxiety-related insomnia

Insomnia is a condition that affects a number of people and yet goes largely untreated (Léger & Bayon, 2010) despite the negative impact on quality of life (Léger & Bayon, 2010), health (Daley, Morin, LeBlanc, Gregoire, Savard, et al., 2009; Novak et al., 2004), daytime functioning (Riedel & Lichstein, 2000), work (Daley, Morin, LeBlanc, Gregoire, Savard, et al., 2009; Léger & Bayon, 2010), and societal costs (Daley, Morin, LeBlanc, Gregoire, & Savard, 2009; Léger & Bayon, 2010). Insomnia can be associated with a number of medical or psychiatric conditions, or can exist on its own (Ohayon et al., 1998).

Typically insomnia treatments target dysfunctional behaviours and cognitions associated with sleep, and physiological arousal using a combination of stimulus control, sleep restriction, cognitive restructuring, and relaxation techniques (Bélanger, 2006; Espie et al., 2001; Morin, 2006; Morin et al., 2002; Troxel, 2012). Although a few insomnia treatment packages also target cognitive arousal (worry and other threat-oriented thoughts), this is not done in a consistent manner; some studies for example specifically aim to target stress and anxiety in a more thorough fashion (e.g., Jansson-Fröjmark et al., 2012), while others use only imagery relaxation techniques to reduce cognitive arousal (e.g., Dopke et al., 2004; Rybarczyk, Lopez, et al., 2005). Moreover, even fewer studies target anxiety in general as well as anxiety associated with sleep (e.g., Espie et al., 2001; Jansson & Linton, 2005).

A growing body of research indicates that anxiety disorders, and cognitive and physiological arousal are significant in the development and maintenance of insomnia. For instance, in regards to comorbidity with other

psychiatric disorders, it appears that anxiety diagnosis precedes insomnia diagnosis (Jansson & Linton, 2006b; Johnson, Roth, & Breslau, 2006; Ohayon & Roth, 2003). Insomnia has also been linked with higher stress system activity (Vgontzas et al., 1998), autonomic nervous system arousal (Waters et al., 1993), cortical hyperarousal (Cortoos et al., 2006), cognitive arousal (Belanger et al., 2005; Ohayon & Roth, 2001), and negative strategies for coping with stress (Morin et al., 2003; Voss et al., 2006). Current models of insomnia development highlight the role of cognitive and physiological arousal processes (Espie, 2002; Espie et al., 2006; Lundh & Broman, 2000) and a review by Riemann et al. (2010) further established the evidence for the hyperarousal model of insomnia. However, while in the medical field there has been a move to include this aspect into the existing biological treatments for insomnia (Bonnet & Arand, 2010), to our knowledge there is no explicit call to integrate these findings in the psychological field.

It was highlighted in Chapter Two that only a small number of insomnia treatment packages target all aspects involved in the development and maintenance of insomnia: the area most often neglected is the cognitive aspect of anxiety, and when anxiety is targeted it is usually the physiological arousal aspect targeted through relaxation. There is ample evidence for the efficacy of cognitive-behavioural therapy for anxiety disorders (Deacon & Abramowitz, 2004; Olatunji, Cisler, & Deacon, 2010) and this is also true in effectiveness studies (R. E. Stewart & Chambless, 2009). There is high co-morbidity between insomnia and anxiety disorders (Belanger et al., 2004; Ohayon et al., 1998) and sub-clinical anxiety might affect a considerable higher number of people. Such people with sub-clinical anxiety would complain of insomnia and associated

worry and physiological arousal but would not meet criteria for a diagnosable anxiety disorder. Treating this population with CBT for insomnia alone might not be sufficient, given that some patients with primary complaint of insomnia do not show significant improvement after treatment (Espie et al., 2007; Morin, Kowatch, et al., 1993). Harvey, Sharpley, Ree, Stinson and Clark (2007) have already demonstrated that targeting daytime safety behaviours in addition to other CBT components proved successful in sustaining treatment effects at 12 months post-treatment. Belanger et al. (2004) showed that treatment for generalised anxiety disorder significantly improved insomnia severity. McGowan and Behar (2013) showed that stimulus control training for worry also significantly reduced insomnia severity. With a growing body of research on the etiology of insomnia that indicates anxiety and arousal play a significant role (Bonnet & Arand, 2010; Johnson et al., 2006; Morin et al., 2003; Riemann et al., 2010; Vgontzas et al., 1998), future studies should not only investigate the specific effects of anxiety treatment on insomnia, but also further evaluate how to best integrate anxiety and insomnia treatments. In the current study anxiety is defined as the emotional experience associated with threat-oriented thoughts that are distressing and physiologically arousing in nature, and that are associated with avoidance or other safety-seeking behaviours.

Given the efficacy of cognitive-behavioural treatments for anxiety disorders, established CBT-based anxiety treatments could be integrated into insomnia treatment packages to specifically address cognitive, behavioural, and physiological aspects of anxiety. Indeed, a meta-analysis by Belleville, Cousineau, Levrier, and St-Pierre-Delorme (2011) concluded that while CBT for insomnia had an overall moderate effect on anxiety, a more thorough treatment

of anxiety might produce better effects. In addressing anxiety more thoroughly in the context of insomnia, the effects on insomnia symptoms might be larger, and the risk of relapse might decrease substantially.

Study aims and hypotheses

The researched described in this paper aimed to a) investigate the effectiveness of a group cognitive-behavioural treatment for insomnia that was comprised of strategies to address both anxiety and sleep problems and b) to determine whether the order of anxiety and insomnia treatments was influential. It was hypothesized that by combining these two treatments:

1) Both treatments would improve insomnia and anxiety, but given the primary complaint of insomnia in the proposed study, the biggest improvements in insomnia would be when insomnia is treated first and anxiety second;

2) Insomnia improvement would be measurable after anxiety treatment when anxiety is treated first;

3) Anxiety improvement would be measurable after insomnia treatment when insomnia is treated first;

4) Dysfunctional sleep beliefs would decrease and quality of life would improve in both treatment conditions;

5) Treatment gains would be sustained at follow-up.

Method

Study Design

This study was a between- and within-groups design where 28 participants were randomly allocated to one of two interventions: *insomnia first* or *anxiety first*.

Participants

Participants attending the cognitive-behavioural group treatment for insomnia at Massey University Psychology Clinic in Wellington during a period of 11 months were invited to take part in the research. Inclusion criteria were: a) suffering from difficulties in initiating or maintaining sleep that last over 30 minutes and were present over three times a week, lasting at least six months; b) excessive worry and belief that was viewed by an assessing clinician as potentially related to the sleep difficulties (even if at a subclinical level that did not meet diagnostic criteria for an anxiety disorder); c) 18 years of age or older; d) comfortable using the English language. Exclusion criteria included: a) insomnia due to medication, mental health problems or other sleep disorder; b) currently taking part in other psychological treatment for insomnia or anxiety; c) current experience of psychotic or other psychiatric symptoms that might warrant immediate attention.

Thirty-three participants—26 females and 7 males, aged 18-74 years, mean, 50 years)—were screened for eligibility. Twenty-eight were randomly assigned to one of two treatment interventions, administered through five treatment groups. Each group had 5-6 participants. Two groups received the *insomnia first* intervention (n = 11) and three groups received the *anxiety first* intervention (n = 17). The majority of participants were in paid employment;

one was retired, one was an undergraduate university student, and another was a postgraduate university student. Twenty-seven participants completed the treatment programme (96%); one participant dropped out after five weeks. Seven participants did not respond to the principal investigator's attempts to contact them for the follow-up assessment. Session attendance rate was 92%—the average participant attended 7.4 of the 8 treatment sessions. Refer to Figure 2 for study participants' flow chart.

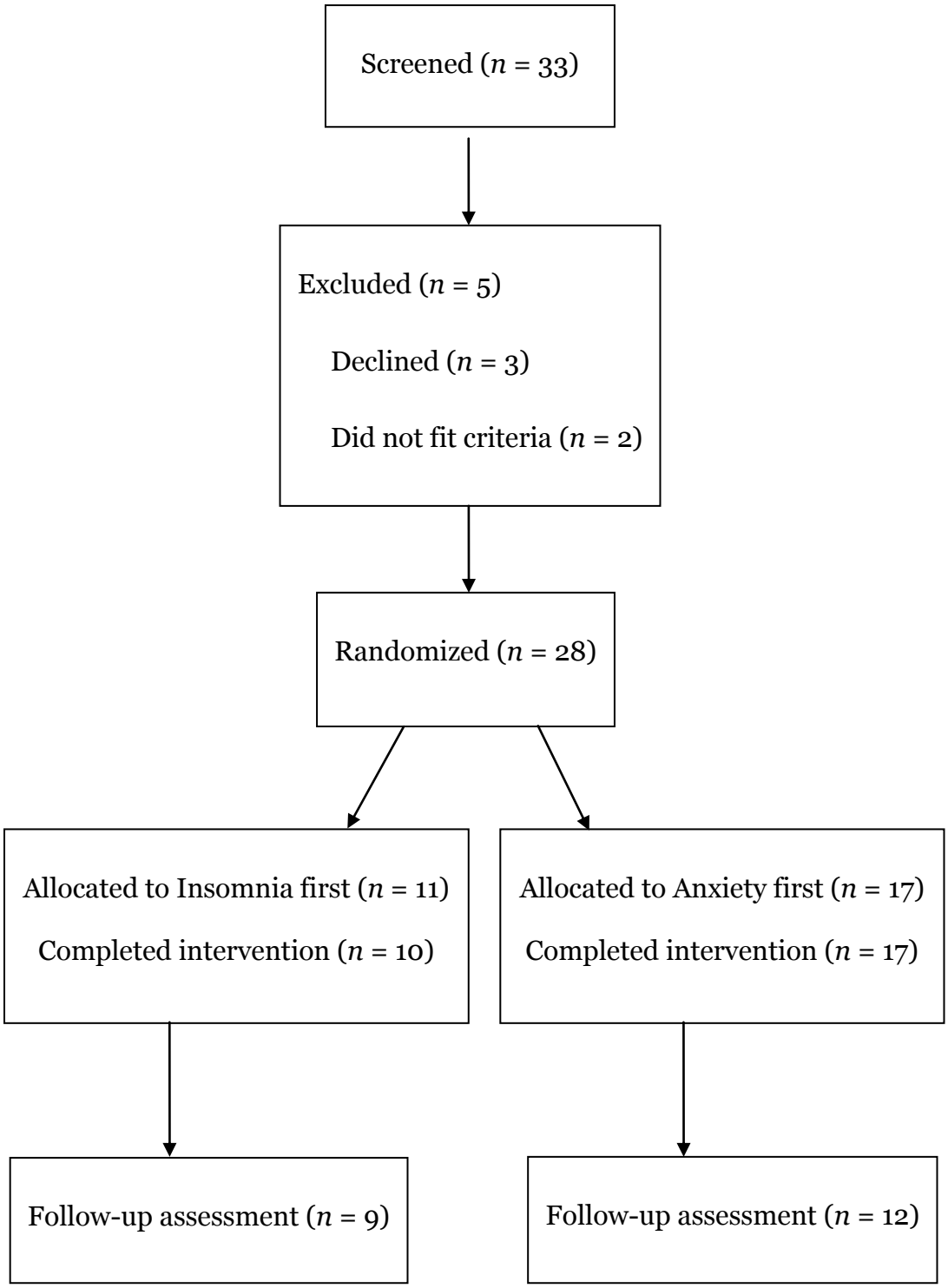

Figure 2. Participant flow chart.

Measures and Materials

The *Sleep Assessment Questionnaire* (Woolcock Institute of Medical Research, 2008) was used as a structured interview to confirm insomnia diagnosis and rule out other sleep disorders.

Primary outcome measures

A *Sleep Diary* (Morin & Espie, 2003) was used as a measure of participants' accounts of sleep. It provided accounts for sleep onset latency (SOL), wake after sleep onset (WASO), total sleep time (TST), total time in bed (TIB), sleep efficiency (SE), and sleeping pill use. Despite being a subjective account of sleep, various formats of sleep diaries have been widely used as outcome measures in insomnia research (Edinger et al., 2009; Morin et al., 1994; Ong et al., 2008).

The *Insomnia Severity Index* (ISI; Morin, 1993) is a 7-item 5-point Likert scale questionnaire that was used to assess clinical caseness and severity of insomnia. The *Insomnia Severity Index* has been widely used as an outcome measure of insomnia treatments. It has good overall internal consistency (Cronbach's Alpha = 0.74) and is sensitive to changes over time, which correlated with changes in polysomnographic data (Bastien, Vallières, & Morin, 2001; Morin, Belleville, Belanger, & Ivers, 2011). It has also been validated in cancer patients and the study showed similar psychometric properties (Savard, Savard, Simard, & Ivers, 2005).

The *Depression Anxiety Stress Scales—21 items* (Lovibond & Lovibond, 1995) is the short version of the full DASS (42 items) presented as a 4-point Likert scale questionnaire. All the scales have adequate construct validity,

convergent and discriminant validity (with measures of depression, anxiety, and positive and negative affect), and good internal consistency (.88 for Depression, .82 for Anxiety and .90 for stress; Henry & Crawford, 2005). Another study with older adults also showed evidence of good convergent and discriminative validity (Gloster et al., 2008). Similar results were also obtained in a study across four ethnic groups in the United States, albeit a small racial effect was found in the Depression subscale (Norton, 2007).

Secondary outcome measures

The *Dysfunctional Beliefs and Attitudes about Sleep scale—16 items* (DBAS-16; Morin, Vallieres, & Ivers, 2007) is a 10-point Likert scale that measures a range of beliefs and attitudes about sleep, insomnia and its consequences. It is an abbreviated version of the 30 item original DBAS (Morin & Espie, 2003). A validation study of the DBAS-16 (Morin et al., 2007) showed it has adequate internal consistency for clinical and research samples (.77 and .79, respectively) and good temporal stability (.83), in addition to good convergent and construct validity (*r*s ranged from .28 to .50. in measures of depression and anxiety, with stronger endorsements of beliefs about insomnia consequences, worry about sleep and medication). This measure has also been shown to discriminate between good and poor sleepers and to be sensitive to treatment changes (Carney & Edinger, 2006; Carney et al., 2010).

The *Quality of Life of Insomniacs* questionnaire (QoLI; Pires de Souza, 1996) is a 52-item multi format questionnaire, where higher scores indicate lower quality of life. Internal consistency ratings range from .73 to .96 across five domains (quality of sleep, quality of awakening, physical well-being, mood and mental state, and relationships). The measure can reliably discriminate

between people with and without insomnia (Jambon, le Gal, & Pilate, 1995), especially in the quality of sleep and mood and mental state domains (Pires de Souza, 1996). Additionally, despite not all psychometric properties being investigated, its use as a broad outcome measure is recommended because it was specifically designed for people with insomnia (Moul, Hall, Pilkonis, & Buysse, 2004).

Procedure

Ethical approval was received from the relevant regional Health and Disability Ethics Committee. An advertisement was placed in a local newspaper and posters were displayed in places like chemists and supermarkets. GP practices around the region in which the treatment was being provided were advised of the service so referrals could be arranged, and publicity information was forwarded to various press outlets.

On contact from prospective participants, an initial phone conversation took place with the first author to screen for inclusion criteria (i.e., main complaint of insomnia and sub-clinical anxiety). Suitable participants attended a screening interview four to six weeks prior to beginning of treatment, in order to evaluate suitability for the group treatment. Interviewers were doctoral-level clinical psychology students supervised by senior clinical psychologists from the psychology clinic. The interviewer collected data on insomnia history, frequency and severity, and on depression, anxiety and stress, beliefs about sleep, and quality of life using the psychometric instruments described above. A second meeting was held between two and three weeks prior the beginning of treatment, so participants who fit the inclusion criteria could read and sign the Consent Form and Information Sheet, and learn how to complete their sleep

diaries as a baseline measure of their sleep. Thereafter they attended eight weekly sessions of group therapy with a two-week break in the middle. Thus, the entire treatment period lasted for nine weeks. Each group session lasted for two hours and included 90 minutes of active treatment. The remaining 30 minutes included a brief review of the previous week and psychometric administration, a short break, and discussion of homework for the following week. Study participants received a partial subsidy for their treatment fees at the psychology clinic.[1]

All participants were contacted approximately three months after the end of the treatment programme to attend a follow-up meeting that lasted about 30 minutes. During this meeting, a brief interview took place to assess whether participants still met insomnia diagnostic criteria and they were asked to complete all the questionnaire-based measures. If a participant could not attend the follow-up meeting, then a phone assessment of their insomnia status took place and questionnaires were mailed to the participant with a return postage-paid envelope. If the questionnaires were not returned within 3-4 weeks, participants received a reminder phone call.

Treatment was divided into two halves of four sessions each, with a two-week break between the two parts (see below). The Sleep Diary was completed for two weeks of continuous recording immediately before the first session, during the break, and immediately after the last session. All other primary outcome measures were administered at intake and weekly throughout treatment. Secondary outcome measures were administered at intake and the

[1] Information given to participants, including study advertisement, can be found in Appendix A.

final week of treatment. All measures were administered at the three-month follow-up. Details regarding key assessment times can be found in Table 3 below.

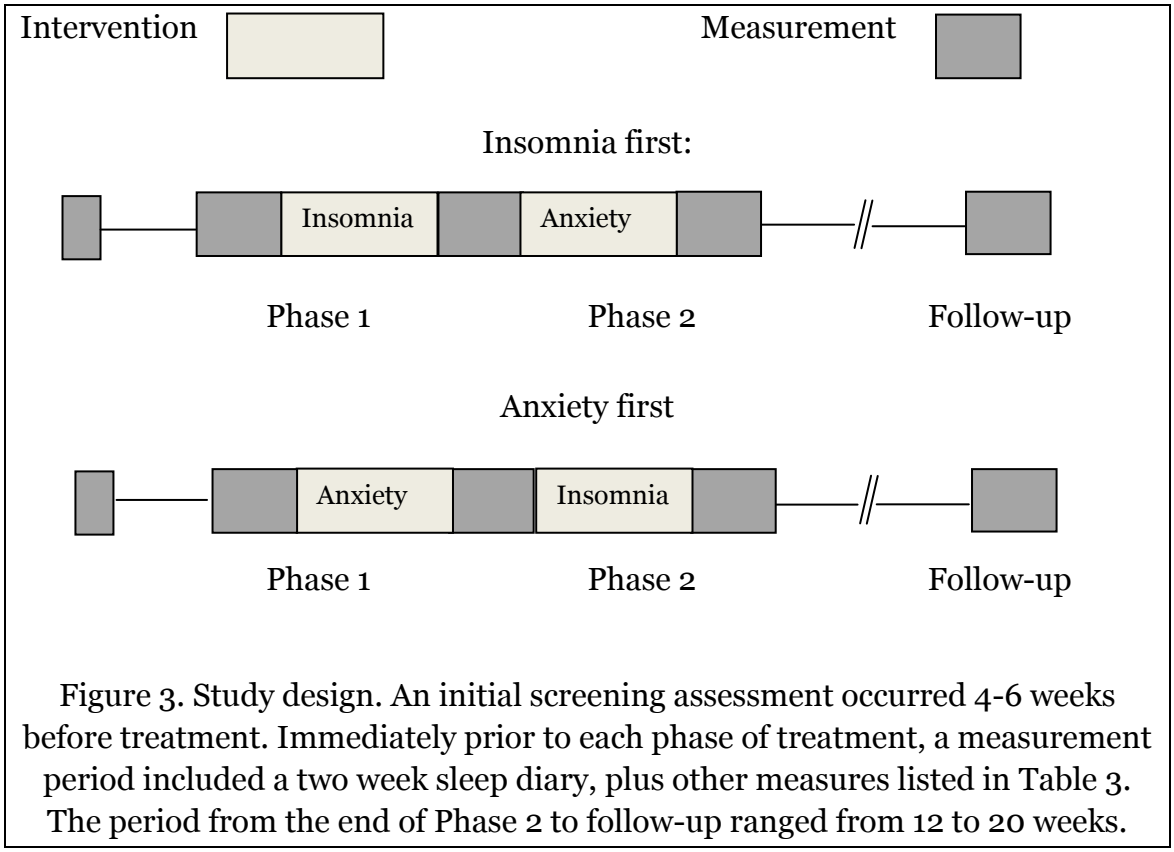

Figure 3. Study design. An initial screening assessment occurred 4-6 weeks before treatment. Immediately prior to each phase of treatment, a measurement period included a two week sleep diary, plus other measures listed in Table 3. The period from the end of Phase 2 to follow-up ranged from 12 to 20 weeks.

Treatment groups ran two at a time, with an insomnia first and anxiety first groups starting in the same week to reduce the influence of extraneous variables (e.g., seasonal variations in sleep). The two treatment combinations were assessed with groups at two different points in time, with a sole fifth group completing data collection. (There were insufficient potential attendees to run a paired group on this occasion.)

Table 3. Assessment instruments and measurement times.

Intake	Pre-treatment (prior to session 1)	Weekly (sessions 1-7)	Mid-treatment (prior to session 5)	Post-treatment (after session 8)	Follow-up
ISI DASS-21 DBAS-16 QoLI SAQ	Sleep Diary	ISI DASS-21	Sleep Diary	ISI DASS-21 DBAS-16 QoLI Sleep Diary	ISI DASS-21 DBAS-16 QoLI Sleep Diary

Note. ISI=Insomnia Severity Index; DASS-21: Depression Anxiety Stress Scales-21 items; DBAS-16: Dysfunctional Beliefs and Attitudes about Sleep scale-16 items; QoLI= quality of Life of Insomniacs questionnaire; SAQ=Sleep Assessment Questionnaire.

The manual[2] used in the treatment was developed by the first and second authors during the first author's doctoral training under the supervision of the second author, with the assistance of another doctoral-level clinical psychology trainee and a senior clinical psychologist at the psychology clinic where the treatment service ran. The manual was based on well-researched interventions for anxiety and insomnia. All sessions began with administration of brief psychometric measures and followed a format of review, theory, activity, and homework. After a review of the previous session's content and homework, theory material about insomnia, sleep or anxiety was introduced, as the means to provide a rationale for interventions, as well as enabling participants to put their individual circumstances in context. The theory part was followed by an activity (either as a group, in pairs or individually) which would demonstrate direct application of theory through a discussion of topics introduced, such as developing exposure hierarchies or examining one's dysfunctional beliefs about

[2] The manual can be found in Appendix B.

sleep and insomnia. Each session finished with discussion of homework for the following week.

There were four sessions for each phase of the treatment, which began with objective information (about sleep or anxiety) and description of the insomnia model, and then progressed from behavioural interventions to cognitive interventions for that focus area (i.e., either sleep or anxiety). The final session of each treatment programme covered relapse prevention. The insomnia sessions covered: sleep information, sleep patterns and habits, sleep interfering behaviours, beliefs about sleep, and challenging misconceptions. The anxiety sessions covered: anxiety information, relaxation techniques, safety-seeking behaviours, avoidance/exposure, anxiety provoking thoughts, and coping mechanisms (seeTable 4 below).

The treatment was delivered by a consultant clinical psychologist (second author) and a doctoral-level clinical psychology trainee (first author in four of the five groups). Sessions were presented with the aid of PowerPoint slides that followed the treatment manual, to ensure each session covered the intended material. The slideshow took a background place while the clinicians presented the main content and the manual allowed time for group discussions. The treatment manual also provided guidelines as to how much time to spend on each part of the session and this further ensured that all material was covered. Summary handouts were provided to participants at the end of every session.[3]

[3] Session handouts can be found in Appendix C and D.

Table 4. Treatment programme overview

	Insomnia first	Anxiety first
Session 1	Anxiety-insomnia model Objective information about sleep	Anxiety-insomnia model Objective information about anxiety
Session 2	Behavioural interventions for sleep	Behavioural interventions for anxiety
Session 3	Cognitive interventions for sleep	Cognitive interventions for anxiety
Session 4	Consolidation and relapse prevention	Consolidation and relapse prevention
Session 5	Anxiety-insomnia model Objective information about anxiety	Anxiety-insomnia model Objective information about sleep
Session 6	Behavioural interventions for anxiety	Behavioural interventions for sleep
Session 7	Cognitive interventions for anxiety	Cognitive interventions for sleep
Session 8	Consolidation and relapse prevention	Consolidation and relapse prevention

Statistical analysis

Missing Data

Data were missing where a participant missed a treatment session and thus did not complete the questionnaires on that occasion, or did not return the follow-up questionnaires. As reported above, session attendance rate was 92%. Missing data rates across the questionnaires used ranged from 9% (DASS-21, ISI) to 12% (DBAS-16) and 20% (Sleep Diary, QoLI). At the individual item level, missing data rates were 9% (DASS-21), 10% (ISI), 12% (DBAS-16), and 22% (Sleep Diary, QoLI).

Data were assessed as missing completely at random using Little's MCAR test. To minimise biases in the final results and potential loss of statistical power, multiple imputation was used to replace missing data. Thus, no participants were excluded from the analyses. Five imputed datasets were created using Multiple Imputation in SPSS Statistics 19.0 for Windows. Unless otherwise specified, results are reported using the pooled results from SPSS.

Planned analyses

The primary outcome analysis was a comparison of the sleep, insomnia, anxiety, and stress measures before and after each treatment phase as well as before and after the treatment programme.

To evaluate the overall effectiveness of treatment, paired *t* tests were used (within each group) to compare scores between baseline and post-treatment on the following measures: *Depression Anxiety and Stress Scales-21 items Anxiety subscale*, *Depression Anxiety and Stress Scales-21 items Stress subscale*, *Insomnia Severity Index*, and *sleep diary* measures—*Sleep Efficiency (SE), Sleep Onset Latency (SOL), Wake After Sleep Onset (WASO), and Total Sleep Time (TST).*

To determine whether treatment order influenced overall treatment effectiveness, independent-samples *t* tests were used (between groups) to compare change scores between baseline and mid-treatment (Insomnia first) and mid-treatment and post-treatment (Anxiety first) on the following measures: *Insomnia Severity Index*, and *sleep diary measures* (SE, SOL, WASO, TST).

To evaluate whether anxiety treatment alone improved insomnia, and

whether insomnia treatment alone improved anxiety, paired *t* tests were used (within each group) to compare scores between baseline and mid-treatment on the following measures: *Insomnia Severity Index*, *Depression Anxiety and Stress Scales-21 items Anxiety subscale*, *Depression Anxiety and Stress Scales-21 items Stress subscale*, and *sleep diary* measures (SE, SOL, WASO, TST).

To evaluate whether the second treatment phase produced additional change, paired *t* tests were used (within each group) to compare scores between mid-treatment and post-treatment on the following measures: *Insomnia Severity Index*, *Depression Anxiety and Stress Scales-21 items Anxiety subscale*, *Depression Anxiety and Stress Scales-21 items Stress subscale*, and *sleep diary* measures (SE, SOL, WASO, TST).

Secondary outcome analyses addressed the overall effects of the treatment programme on measures of quality of life and beliefs about sleep. To evaluate whether treatment altered these outcomes, paired *t* tests were used (within group with the combined sample) to compare scores between baseline and post-treatment on the following measures: *Dysfunctional Beliefs and Attitudes about Sleep* scale (16 items) and *Quality of Life of Insomniacs-Total Score*.

Finally, to assess whether treatment gains were maintained, paired *t* tests were used (within each group) to compare scores between post-treatment and follow-up at least three months post-treatment for all measures.

Baseline data were calculated by averaging the scores between Intake and Week 1, since the latter measures were completed at the beginning of the first treatment session.

Effect sizes were calculated using Cohen's *d*, calculated as the difference between paired means divided by the pooled standard deviation of the means (Cohen, 1992), and corrected to account for the repeated measures design (Morris & DeShon, 2002). Effects of 0.2 are considered small, 0.5 medium, and 0.8 large (Cohen, 1992).Preliminary power calculations demonstrated sufficient power to detect a large effect.

Since *t* tests require that data be normally distributed, the normality of the change scores between baseline and mid-treatment, mid-treatment and post-treatment, baseline and post treatment, and post-treatment and follow-up was evaluated. If assumptions were not met, nonparametric test equivalents and/or appropriate corrections were utilised.

Results

All statistical analyses were undertaken using SPSS Statistics 19.0 for Windows. *p* values less than .05 were considered statistically significant. Adjustment for multiple comparisons was not performed for the following reasons: the current study had specific hypotheses to be tested i.e., it was not an exploratory study searching for associations without pre-established hypothesis; *t* tests were not repeated with subsamples; given the established efficacy of the interventions utilised, the chances of several *t* tests being significant due to chance is low; and at this stage of development of understanding of this areas a Type II error is as harmful as a Type I error (Moran, 2003; Nakagawa, 2004; Perneger, 1998). In addition, the results reported include all tests, not only the statistically significant one. Means, confidence intervals, *t* and *p* values for all measures are reported in Table 5 and Table 6 below.

Table 5. Descriptive statistics (mean, 95% CI) for all measures

		Baseline	Mid-treatment	Post-treatment	Follow-up
Insomnia 1st	ISI	16.00 ± 2.65	12.80 ± 3.36	10.35 ± 3.06	8.36 ± 2.86
	DASS-21 Anxiety	9.82 ± 4.69	8.57 ± 4.86	6.58 ± 3.28	7.45 ± 3.33
	DASS-21 Stress	20.27 ± 6.16	16.59 ± 5.84	11.18 ± 4.34	13.30 ± 5.35
	Sleep diary SOL	33.21 ± 13.29	32.40 ± 17.57	25.20 ± 8.54	25.72 ± 6.78
	Sleep diary WASO	54.96 ± 18.86	69.95 ± 21.86	54.29 ± 13.42	38.79 ± 12.99
	Sleep diary TST	411.39 ± 62.09	401.24 ± 63.53	423.84 ± 58.97	418.57 ± 49.65
	Sleep diary SE	81.48 ± 6.51	78.60 ± 7.73	83.26 ± 5.34	86.03 ± 4.61

Table 5. Descriptive statistics (mean, 95% CI) for all measures (continued)

		Baseline	Mid-treatment	Post-treatment	Follow-up
Anxiety 1st	ISI	17.75 ± 1.83	14.43 ± 2.34	11.46 ± 1.65	11.09 ± 2.71
	DASS-21 Anxiety	9.83 ± 4.43	5.31 ± 2.85	4.00 ± 3.43	5.29 ± 2.89
	DASS-21 Stress	17.74 ± 4.67	11.38 ± 3.73	8.82 ± 3.98	12.36 ± 4.80
	Sleep diary SOL	46.49 ± 17.28	36.12 ± 11.25	31.54 ± 8.15	26.85 ± 7.39
	Sleep diary WASO	92.66 ± 26.90	89.05 ± 25.95	70.09 ± 22.10	59.30 ± 16.52
	Sleep diary TST	402.10 ± 28.40	404.93 ± 22.64	409.12 ± 26.01	430.93 ± 26.63
	Sleep diary SE	74.26 ± 4.50	76.56 ± 4.09	80.17 ± 4.49	83.34 ± 2.93

Table 5. Descriptive statistics (mean, 95% CI) for all measures (continued)

		Baseline	Mid-treatment	Post-treatment	Follow-up
Combined sample	DBAS-16	5.43 ± 0.63	_____	3.44± .58	3.22 ± 0.49
	QoLI	3195 ± 434	_____	2523 ± 292	1814 ± 377

Note: All statistics are drawn from imputed datasets. ISI = Insomnia Severity Index; DASS-21 = Depression Anxiety and Stress Scales-21 items; SOL = Sleep Onset Latency; WASO = Wake After Sleep Onset; TST = Total Sleep Time; SE = Sleep Efficiency; DBAS-16 = Dysfunctional Beliefs and Attitudes about Sleep-16 items; QoLI = Quality of Life of Insomniacs.

Table 6. Paired-samples t tests for all measures.

		Baseline-Mid	Mid-Post	Baseline-Post	Post-Follow-up
Insomnia 1st	ISI	**t(1647) = 2.621, p = .009**	**t(275) = 2.105, p = .04**	**t(28273) = 3.972, p <.001**	t(178) = 1.561, p = .12[a]
	DASS-21 Anxiety	t(1479) = 1.109, p = .27	t(5030) = 1.010, p = .31	t(4717) = 1.497, p = .13[b]	t(579) = -.507, p = .61[b]
	DASS-21 Stress	t(135492) = 1.191, p = .23[b]	**t(25578) = 2.158, p = .03**	**t(22882) = 2.607, p = .009[a]**	t(523) = -.766, p = .44
	Sleep diary SOL	t(427591) = 0.143, p = .89	t(7652591) = 1.092, p = .27[b]	t(216241) = 1.332, p = .18	t(125662) = -0.132, p = .89
	Sleep diary WASO	**t(578803) = -2.538, p = .01[b]**	t(181823) = 1.800, p = .07	t(26503) = - 0.100, p = .921	**t(40166) = 3.315, p = .001[b]**
	Sleep diary TST	t(11739) = -0.874, p = .38[b]	t(181) = -1.640, p = .10	t(200) = -0.751, p = .45[b]	t(19) = 0.274, p = .79
	Sleep diary SE	t(2783525) = 1.744, p = .08	**t(35947) = -2.153, p = .03**	t(6491) = -1.177, p = .24	t(479) = -1.967, p = .05[b]

Table 6. Paired-samples t tests for all measures (continued).

		Baseline-Mid	Mid-Post	Baseline-Post	Post-Follow-up
Anxiety 1st	ISI	**t(1708) = 3.574, p <.001**	**t(2424) =3.381, p = .001**	**t(497600) = 5.931, p <.001**	t(1337) = .089, p = .93[b]
	DASS-21 Anxiety	**t(17120) = 2.583, p = .01**	t(5457) = 1.221, p = .22	**t(2733997) = 3.690, p <.001[b]**	t(866) = -.794, p = .43[b]
	DASS-21 Stress	**t(33092) = 3.211, p = .001[b]**	t(4416) = 1.878, p = .06	**t(9065296) = 4.297, p <.001[b]**	t(87) = -2.018, p = .05
	Sleep diary SOL	**t(404642) = 2.487, p = .01**	t(137500) = .0954, p = .34[b]	t(272907) = 1.957, p = .05	**t(22734) = 2.007, p = .04**
	Sleep diary WASO	t(7013934) = 0.483, p = .63[b]	t(3765261) = 2.194, p = .28	**t(7115544) = 2.648, p = .008**	t(4809998) = 1.090, p = .28[b]
	Sleep diary TST	t(307) = -0.344, p = .73[b]	t(1522) = -0.500, p = .62	t(1398) = -0.726, p = .47[b]	t(2351) = -1.559, p = .12
	Sleep diary SE	t(25725) = -1.689, p = .09	**t(91835) = -2.455, p = .01**	**t(44787) = -3.618, p <.001**	t(9989038) = -1.473, p = .14[b]

Table 6. Paired-samples t tests for all measures (continued).

		Baseline-Mid	Mid-Post	Baseline-Post	Post-Follow-up
Combined sample	DBAS-16	_____	_____	**t(196480) = 6.412, p < .001**	t(552) = 1.120, p = .26
	QoLI	_____	_____	**t(9469825) = 3.100, p = .002[b]**	**t(953266) = 4.635, p <.001**

Note: All statistics are drawn from imputed datasets. Significant results (p < .05) are depicted in bold. ISI = Insomnia Severity Index; DASS-21 = Depression Anxiety and Stress Scales-21 items; SOL = Sleep Onset Latency; WASO = Wake After Sleep Onset; TST = Total Sleep Time; SE = Sleep Efficiency; DBAS-16 = Dysfunctional Beliefs and Attitudes about Sleep-16 items; QoLI = Quality of Life of Insomniacs.

[a] Results of the Wilcoxon signed-rank test were the same in 4 out of the 5 imputed datasets and t test is reported instead.

[b] Results of the Wilcoxon signed-rank test were the same across all imputed datasets and t test is reported instead.

Baseline

A significant difference on *Insomnia Severity Index* scores between Intake and Week 1 was found,[4] $t(113181) = 2.013$, $p = .044$. One participant with a sharp decrease from Intake to Week 1 was identified and in order to examine whether this outlier had a substantial effect on the finding, the analysis was re-run substituting the group mean at each time point for that participant's score. Following this analyses, the originally observed difference between Intake and Week 1 was no longer found, $t(31909) = 1.756$, $p = .08$. While a significant decrease happened between intake and week 1 and waitlist effects are known to occur, spontaneous remission would be unlikely given the chronicity of insomnia and therefore this variation could be attributed to random fluctuation or expectation of treatment effects. In either case, the average estimate using that participants' original scores would still provide an appropriately conservative baseline measure.

There was no significant difference between Intake and Week 1 on the scores of the *Depression Anxiety Stress Scales-21* Anxiety subscale, $t(418808) = 0.889$, $p = .37$, or *Depression Anxiety Stress Scales-21 Stress* subscale, $t(1459203) = 0.332$, $p = .74$.

Assumptions of normality

Normality was assessed using a combination of visual inspection of histograms and Q-Q plots, as well as the Shapiro-Wilk test. Due to the small sample size (n=28) it was decided the formal test of normality would be more reliable (Shapiro, Wilk, & Chen, 1968). Normality was assessed using change

[4] The large degrees of freedom value reported results from the pooling process for the imputed datasets.

scores between baseline and mid-treatment, mid-treatment and post-treatment (for primary outcome measures only), and baseline and post-treatment, and post-treatment and follow-up (for all measures). When a variable failed to meet normality requirements, the Wilcoxon signed-rank test (for within-participant analyses) or the Mann-Whitney (for between-participant analyses) was used in addition to Students' *t* test. For simplicity, if both tests provided the same result, only *t* tests were reported. Twenty-four variables were statistically significant in the Shapiro-Wilk test. Of those, twenty-two variables had the same results as the *t* test in all imputed dataset and two variables had the same result as the *t* test in 4 out of 5 imputed datasets[5] (and were therefore considered the same as the *t* test).

Hypothesis 1—*Both treatments would improve insomnia and anxiety, but given the primary complaint of insomnia in the proposed study, we expect the biggest improvements in insomnia would be when insomnia is treated first and anxiety second*. In comparing scores between baseline and post-treatment, at the end of the treatment programme, participants receiving *insomnia first* treatment had a significant decrease on *Insomnia Severity Index* scores and *DASS-21 Stress* subscale score (see Table 5, Table 6, and Figure 4) with large effect sizes (see Table 7). These same participants, however, did not have a significant change at the end of the treatment programme on DASS-*21 Anxiety*, *Sleep Onset Latency*, *Wake After Sleep Onset*, *Total Sleep Time*, or *Sleep Efficiency*.

[5] Unlike the t test, the Wilcoxon signed-rank test does not pool the results and reported results for each of the five imputed datasets.

In comparing scores between baseline and post-treatment, participants receiving the anxiety intervention first had a significant decrease at the end of the treatment programme on *Insomnia Severity Index*, *DASS-21 Anxiety*, *DASS-21 Stress*, *Sleep Onset Latency*, and *Wake After Sleep Onset*, and a significant increase in *Sleep Efficiency*. Effect sizes for these measures were medium to large, with the biggest changes seen in measures of insomnia severity, anxiety, and stress (see Table 7). These participants did not have a significant change on *Total Sleep Time* at the end of the treatment programme.

These results provide partial support for our hypothesis that both treatments will improve anxiety and insomnia, in that the *insomnia first* intervention produced significant changes in measures of insomnia severity and stress, but not on measures of anxiety or quantitative sleep parameters. Participants receiving the *anxiety first* intervention improved on all of these measures. (See also Figure 4.) These results indicate that while both treatment programmes had similar effects on measures of insomnia severity and stress the *anxiety first* intervention had additional impact on measures of anxiety and quantitative sleep parameters. This provides support for the argument that anxiety has an effect on insomnia and that treating anxiety may have reduced the arousal before sleep thus allowing the sleep process to occur naturally (Espie et al., 2006).

As reported above, only participants receiving the *anxiety first* treatment showed significant change between baseline and post-treatment in the sleep diary variables, indicating that, for this measure, this treatment order was superior to the insomnia first treatment. Therefore, comparison of change scores between the two treatment programmes was restricted to the *Insomnia*

Severity Index (which showed significant decrease at the end of both treatment programmes). In comparing change scores on the *Insomnia Severity Index* between baseline and post-treatment, at the end of each treatment programme, participants receiving both interventions had similar reductions on *Insomnia Severity Index* scores. Likewise, when change scores on the *Insomnia Severity Index* after the insomnia intervention phase only were compared, there was no significant difference between groups in regards to treatment order and indeed, their effect sizes were comparable (0.86 for the *insomnia first* group and 0.92 for the *anxiety first* group). Similar changes in insomnia severity occurred across both treatment conditions, and these results seem to be contrary to our hypothesis that insomnia improvements would be greater when insomnia was treated first (See Figure 4.).

Despite randomisation, participants in the *anxiety first* treatment had significantly higher *Wake After Sleep Onset* time than participants in the *insomnia first* treatment, $t(92639494.58) = -2.249$, $p = .02$, and this could have led to inflated chances of finding significant differences in the *anxiety first* group (i.e., increased severity gives way to higher improvement). Alternatively, because there were more participants in the *anxiety first* group than the *insomnia first* group (due to the fifth group being randomly assigned to this condition), it is possible that this difference in sample sizes could have led to increased chance of finding significant changes for the anxiety first group. What was interesting to note however, was that the pattern of change differed across the two groups: the *insomnia first* group showed a significant *increase* of *Wake After Sleep Onset* after the first half of treatment (i.e., a change in the undesirable direction, most likely as an expected consequence of stimulus

control instructions) and a steady decrease thereafter. In contrast, the *anxiety first* group showed a steady decrease from baseline to follow-up (i.e., with no increase as a consequence of stimulus control instructions).

Table 7. Effect sizes for all measures.

		Baseline-Mid	*Mid-Post*	*Baseline-Post*	*Baseline-Follow-up*
Insomnia 1st	ISI	**.86**	.72	**1.25**	**3.35**[a]
	DASS-21 Anxiety	.36	.35	.49	.42
	DASS-21 Stress	.37	.70	**.82**	.58
	Sleep diary SOL	.05	.44	.45	.41
	Sleep diary WASO	**.86**	.64	.04	**1.07**
	Sleep diary TST	.29	.60	.27	.22
	Sleep diary SE	.65	**.83**	.37	**1.09**
Anxiety 1st	ISI	**.93**	**.92**	**1.47**	**1.17**
	DASS-21 Anxiety	.69	.32	**.95**	.56
	DASS-21 Stress	**.82**	.47	**1.07**	.51
	Sleep diary SOL	**.87**	.24	.54	.73
	Sleep diary WASO	.12	.55	.67	.77
	Sleep diary TST	.10	.13	.19	.50
	Sleep diary SE	.42	.61	**.90**	**1.17**
Combined sample	DBAS-16			**1.23**	**1.31**
	QoLI			.60	**1.11**

Note. ISI = Insomnia Severity Index; DASS-21 = Depression Anxiety and Stress Scales-21 items; SOL = Sleep Onset Latency; WASO = Wake After Sleep Onset; TST = Total Sleep Time; SE = Sleep Efficiency; DBAS-16 = Dysfunctional Beliefs and Attitudes about Sleep-16 items; QoLI = Quality of Life of Insomniacs.

[a] This unusually high effect size value is a result of the high correlations between the scores at these two points in time. The insomnia first treatment had a higher correlation between baseline and follow-up than the Anxiety first treatment, and the higher the correlation, the lower is the proportion of unshared variance, and thus, the effect size is larger.

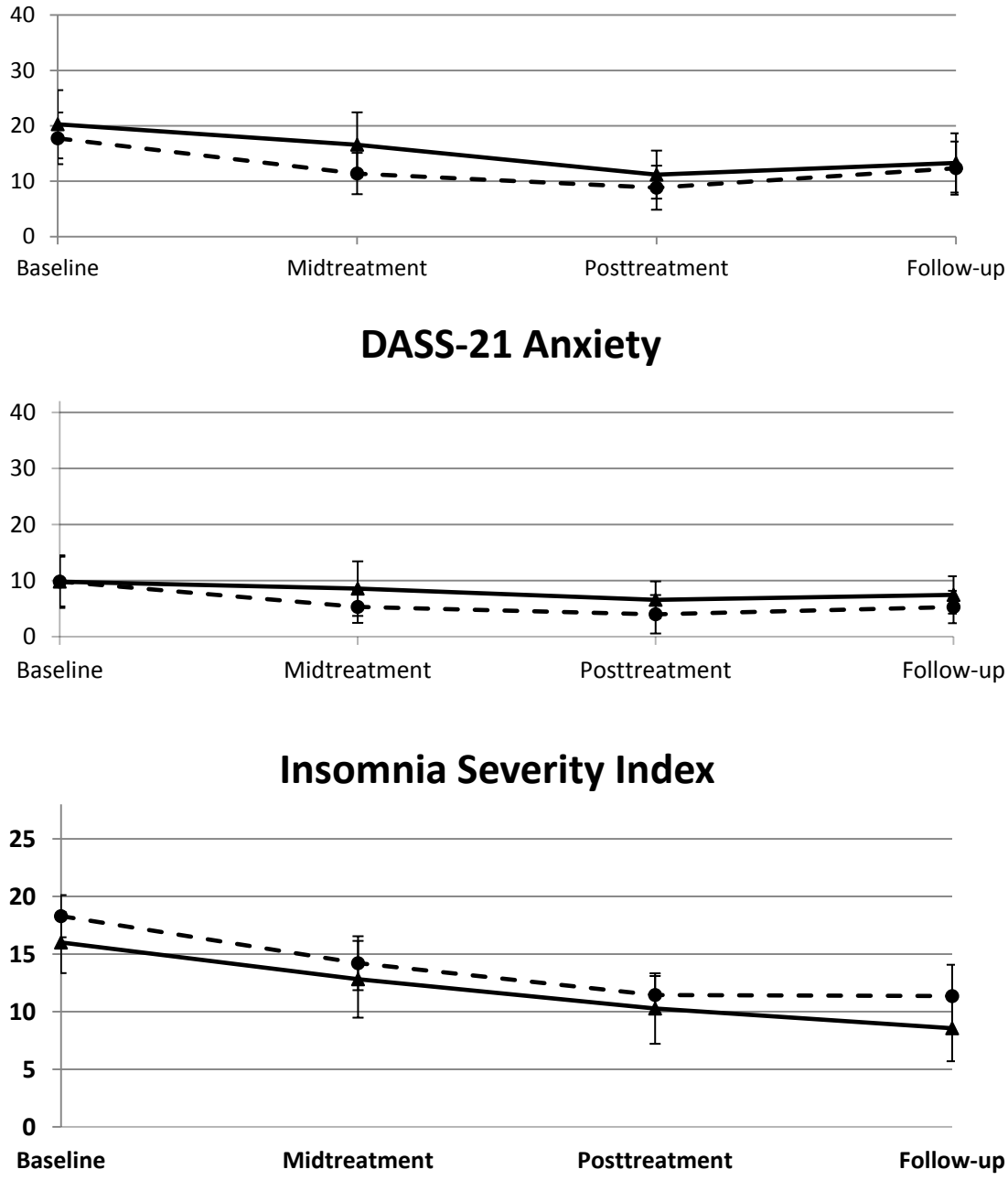

Figure 4. Depression Anxiety Stress Scales and Insomnia Severity Index means with 95% confidence intervals across main time points. Broken lines represent the anxiety first group.

Hypothesis 2—*Insomnia improvement will be measurable after anxiety treatment when anxiety is treated first*. Participants in the *anxiety first* group had a significant decrease after the anxiety intervention on *Insomnia Severity Index* and *Sleep Onset Latency*, but not on *Wake After Sleep Onset*,

Total Sleep Time, or *Sleep Efficiency* (see Table 6). These results provide some support for our hypothesis that anxiety treatment improves insomnia, particularly when measures of insomnia severity and sleep onset latency are concerned (effect sizes were large, 0.93 and 0.87, respectively; see Table 7).

Hypothesis 3—A*nxiety improvement will be measurable after insomnia treatment when insomnia is treated first.* Contrary to this hypothesis, participants who received the *insomnia first* intervention were not found to have a significant change on the *DASS-21 Anxiety* or on the *DASS-21 Stress* scores after the insomnia intervention (see Table 6). As our hypothesis was not supported, these results could indicate the impact of anxiety on insomnia is greater than the reverse—though clearly the current study is not designed to be able to prove this is a causal relationship.

Hypothesis 4—*Dysfunctional sleep beliefs will decrease and quality of life will improve in both groups after treatment*. At the end of the treatment programme, participants in both treatment conditions (i.e., combined sample) had a significant decrease on *Dysfunctional Beliefs and Attitudes about Sleep* and a significant increase on *Quality of Life of Insomniacs* (for this measure, lower scores represent better quality of life; see Figure 5). Treatment gains were evident by the medium and large effect sizes observed (see Table 7).

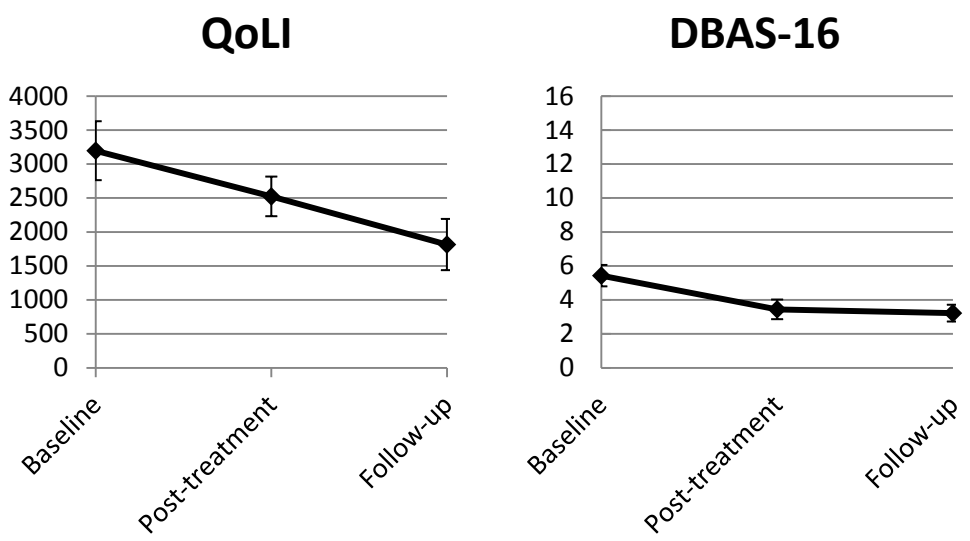

Figure 5. Means with 95% confidence intervals on the Dysfunctional Beliefs and Attitudes about Sleep and Quality of Life of Insomniacs

Hypothesis 5—*Treatment gains will be sustained at follow-up*.

Primary outcome measures. For participants who received the *insomnia first* intervention and had a significant improvement at post-treatment, on the *Insomnia Severity Index* no significant difference was found between post-treatment and follow-up (see Table 6). This maintenance of treatment gains was evident by the large effect size at follow-up (see Table 7). In regards to *DASS-21 Stress*, although a significant improvement was seen at post-treatment (with a large effect size), at follow-up there was a trend towards some erosion of the treatment effects in this measure. However, the sample still sustained a meaningful treatment effect for stress reduction as demonstrated by the observed medium effect size at follow-up. In contrast, *Wake After Sleep Onset*, and *Sleep Efficiency* showed no significant improvement at post-treatment, but significant changes were found at follow-up—with large effect sizes. For these variables, perhaps the additional time after the end of treatment was needed for the changes to be measurable, whereby participants may have needed to continue to implement the therapeutic techniques over the subsequent months.

In the case of wake after sleep onset, a significant increase in the mean value during treatment was observed (see Table 6), which then returned to baseline at the end of the treatment programme. It is possible that this increase happened as a result of the insomnia intervention—whereby participants were asked to get out of bed for 20 minutes if not asleep quickly. Therefore, over time the initial disturbance caused by using stimulus control subsided and the actual effects of treatment could be seen at follow-up. In measures of anxiety, sleep onset latency, and total sleep time, no significant effects were found at any assessment point.

For participants who received the *anxiety first* intervention, except for total sleep time and stress, all measures showed either maintenance (some variation of the means but the differences were not statistically significant; see Table 6) or improvement of treatment gains at follow-up. This is evidenced by the medium to large effect sizes observed (see Table 7). For total sleep time, no significant effects were found at any assessment point.

For the secondary outcome measures in the combined sample, the quality of life measure continued to show further significant improvement between post-treatment and follow-up whereas the dysfunctional beliefs about sleep score showed maintenance of treatment gains (see Table 6).

Clinical significance

Clinical significant was established using the method described by Jacbson and Truax (1991) and rated according to the following categories: Deteriorated, Unchanged, Improved, and Recovered (Bauer, Lambert, & Nielsen, 2004). The criteria used to establish clinical meaningfulness was *Sleep*

Efficiency of at least 85%, and an *Insomnia Severity Index* score equal or lesser than 10 (Morin et al., 2011). The values were based on comparisons between baseline and follow-up scores. As seen in Table 8, at least 70% of participants were classified as *Improved* or *Recovered*.

Table 8. Clinical significance on measures of sleep efficiency and insomnia severity

	Deteriorated	Unchanged	Improved	Recovered
Sleep efficiency	4%	26%	59%	11%
Insomnia Severity Index	3.6%	10.7%	39.3%	46.4%

Examining scores in greater detail, *Sleep Efficiency* for group participants at baseline was 76% and this increased to 81% at post-treatment, and 84% at follow-up, where only 4 participants (15%) had *Sleep Efficiency* below 80% (see also Figure 6).

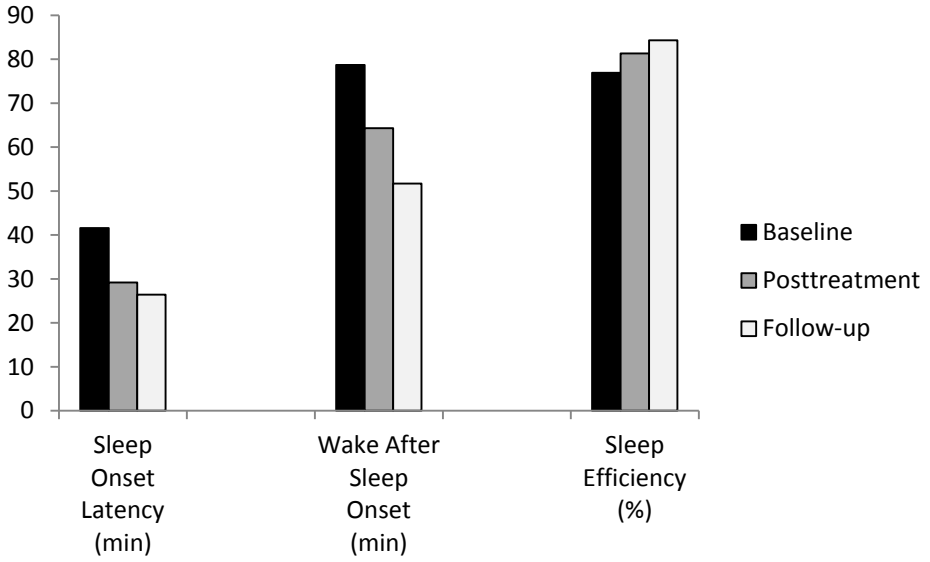

Figure 6. Participants' scores on sleep diary variables at key time points.

In regards to the *Insomnia Severity Index*, at baseline 79% of participants were in the *Moderate* or *Severe* ranges and 21% were in the

Subthreshold range. At post-treatment 21% of participants were in the *Moderate* or *Severe* ranges and 79% in the *Subthreshold* or *Non-clinical* ranges. At follow-up, 11% of participants were in the *Moderate* or *Severe* ranges and 89% of participants were in the *Subthreshold* or *Non-clinical* ranges (see Figure 7 below). Overall, group participants had a 41% reduction in *Insomnia Severity Index* scores. The clinical ranges described were based on Morin (1993) and are classified as follows: 22–28 = *Severe* clinical insomnia, 15–21 = *Moderate severity* clinical insomnia, 8–14 = *Subthreshold* insomnia, 0–7 = *Non-clinical* range (no significant insomnia).

Furthermore, Figure 8 below shows that participants also shifted towards less severe categories in measures of anxiety and stress.

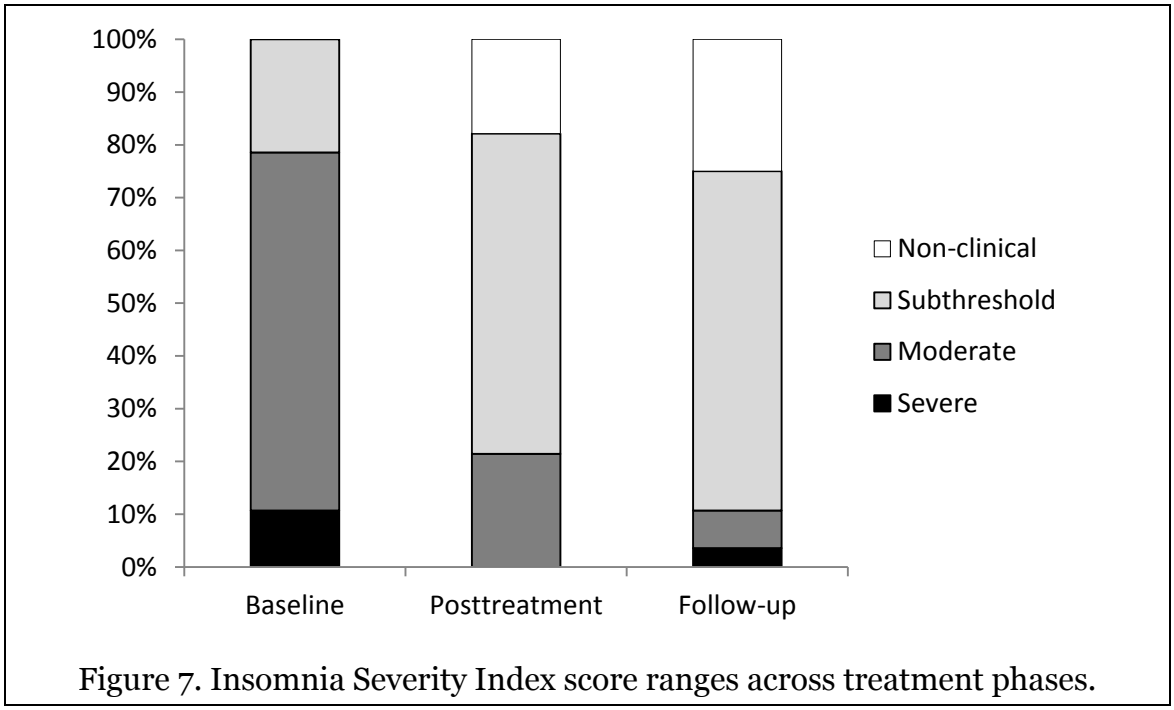

Figure 7. Insomnia Severity Index score ranges across treatment phases.

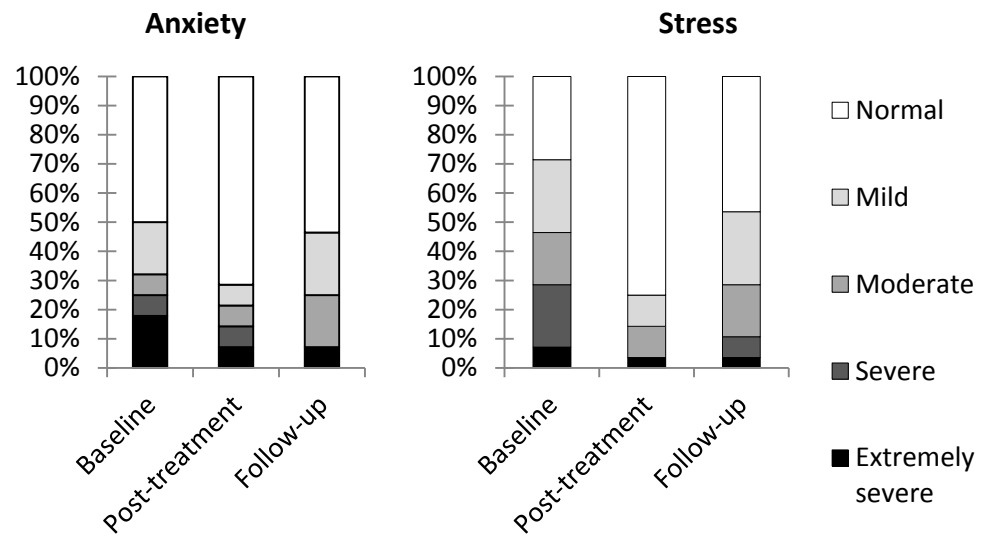

Figure 8. Participants' scores on DASS-21 subscales distributed according to clinical ranges at key time points

In summary, at follow-up both interventions had large positive effect sizes indicating improvements in insomnia severity, sleep efficiency, dysfunctional sleep beliefs, and quality of life. Medium effect sizes were also observed for both interventions in the area of stress. Interestingly, while the *insomnia first* intervention produced better effect for wake after sleep onset, the *anxiety first* intervention produced better effect for anxiety, sleep onset latency, and total sleep time. These results indicate that the *anxiety first* intervention not only produced additional gains in comparison to the *insomnia first* intervention, but also it may have protected against temporary sleep disturbances that result from behavioural interventions such as stimulus control as seen by the continued improvement trajectory in this group.

Discussion

In examining the question of how to best combine the anxiety and insomnia treatments, it appears that at post-treatment the *anxiety first* intervention produced better results, as evidenced by the additional gains in

measures of anxiety, stress, and quantitative sleep parameters. Furthermore, targeting anxiety first may also act as a buffer from the expected initial sleep disturbances from the tradition insomnia interventions. Despite a difference in sample sizes between the two groups, which could have led to increased chance of finding significant changes for the *anxiety first* group, this explanation cannot account for the different pattern in *Wake After Sleep Onset* or *Sleep Efficiency* scores. This finding is contrary to our hypothesis that the insomnia first treatment would produce better results. Blais, Mimeault, and Morin (2000) investigated a combination of CBT treatments for insomnia and generalized anxiety disorder in a sample of people suffering from the primary anxiety disorder. They found that while both treatments improved sleep and anxiety after treatment, people who received anxiety treatment first fared better at the three-month follow-up. Similarly we found at the three-month follow-up the *anxiety first* groups fared equally or better than the *insomnia first* group in all variables except for *Wake After Sleep Onset*. However, the ability to directly compare our study and Blais at al.'s study is limited by the fact that we differed on population targeted and anxiety treatment used. Given that the current study is essentially a pilot study, larger scale studies are needed to further investigate these issues, especially concerning the effects of anxiety interventions on insomnia.

Table 9. Mean effect sizes (*d*) of psychological treatments of insomnia

		Okajima et al. (2011)	Current study	
			Insomnia 1st	Anxiety 1st
Post-treatment mean effect size	SOL	0.67	0.45	0.54
	WASO	0.70	0.04	0.67
	SE	**0.89**	0.37	**0.90**
	Insomnia	**0.94**	**1.25**	**1.47**
	DBAS	**1.17**	**1.45**	**1.12**
Three-month follow-up mean effect size	SOL	0.76	0.41	0.73
	WASO	0.68	**1.07**	0.77
	SE	**1.07**	**1.09**	**1.17**
	Insomnia	**1.13**	**3.35**	**1.17**
	DBAS	**1.09**	**1.36**	**1.30**

Note: Large effect sizes are depicted in bold and small affect sizes are lighter.

Table 9 shows that the current study had effect sizes of at least similar magnitude of those published in a meta analysis by Okajima, Komada, and Inoue (2011). At our follow-up point the treatment effects from the two interventions examined in the current study seemed more equivalent, but three months is relatively short term. It would be important to know how participants receiving combined anxiety and insomnia treatments fare in the long term (i.e., 12 months plus). In particular, future studies could investigate whether the addition of anxiety treatment to insomnia interventions can prevent insomnia recurrence in the longer term.

In examining the immediate effects of anxiety treatment on insomnia, we found partial support for our second hypothesis (that *insomnia improvement will be measurable after anxiety treatment when anxiety is treated first*) where anxiety treatment produced significant changes in insomnia severity and sleep onset latency (with large effect sizes), but not in sleep efficiency, wake after sleep onset or total sleep time. Few studies in the literature specifically examined the effects of anxiety treatment on insomnia. Bélanger, Morin, Langlois, and Ladouceur (2004) and Blais, Mimeault, and Morin (2000) found a significant reduction in insomnia severity after treatment for generalized anxiety disorder. Participants in these studies, however, had a primary anxiety disorder and subtreshold insomnia severity. McGowan and Behar (2013) found that stimulus control training for worry significantly reduces insomnia severity amongst university students with high trait worry. The literature on the effect of anxiety treatments on insomnia is scarce and a recent meta-analysis showed that only 2% of studies of CBT for anxiety disorders included sleep as an outcome measure. The combined effect size of those studies was moderate (Belleville, Cousineau, Levrier, St-Pierre-Delormeb, & Marchand, 2010). Our study found large effect sizes for the immediate effect of anxiety treatment on insomnia but because participants later received treatment for insomnia, we cannot speculate about the longer term effect of the anxiety intervention in isolation.

Our treatment produced a significant decrease in *Wake After Sleep Onset* but there were still a considerable number of people who did not achieve the clinical target of spending less than 30 minutes awake during the night. Despite sleep restriction procedures being often used as part of treatment packages for

insomnia (e.g., Bastien et al., 2004; Dopke et al., 2004; Edinger et al., 2009; Edinger & Sampson, 2003; Rybarczyk, Stepanski, et al., 2005), in our study we chose to use Stimulus Control as the behavioural component targeting sleep consolidation for several reasons: evidence of its efficacy for both the onset and maintenance types of insomnia (Morin & Azrin, 1987; Morin & Azrin, 1988), being an empirically-supported treatment for insomnia (Morin et al., 2006), and concerns that interventions such as Sleep Restriction may cause further distress for our participants.[6] Stimulus Control instructions may be more difficult to follow during the night as opposed to when a person first goes to sleep and therefore the maintenance type of insomnia may require a longer or more tailored intervention than provided in the current treatment package (Vincent, Lewycky, & Finnegan, 2008). Edinger, Wohlgemuth, Radtke, Coffman, and Carney (2007) found that the best 'dose' of CBT included a combination of therapist input and time for clients to independently implement strategies. Our primary expectation was that treatment gains would develop further as participants continued to use the strategies they learned over the long term. However, allowing more time for our clients to independently implement the strategies between sessions or between treatment phases might have achieved different results during the study period, especially when behavioural interventions are concerned. Harvey, Inglis, and Espie (2002) found that the home use of stimulus control and/or sleep restriction was the best predictor of reductions in *Sleep Onset Latency* and *Wake After Sleep Onset*. Harvey et al.'s study highlights the importance of addressing difficulties in implementation of therapeutic techniques. Future studies should not only investigate more closely

[6] Interestingly, Smith, Huang, & Manber (2005) also share the same reservations in regards to the use of Sleep Restriction with anxious clients.

the different effects of Stimulus Control and Sleep Restriction on insomnia symptoms, but also examine to ways to increase adherence to these insomnia treatment components (Vincent et al., 2008).

We did not find support for our third hypothesis (*Anxiety improvement will be measurable after insomnia treatment when insomnia is treated first).* This finding is in contrast to Perlman, Arnedt, Earnheart, Gorman and Shirley (2008), who found significant reductions over time with medium and large effect sizes on measures of state and trait anxiety, respectively. Although Perlman et al. used cognitive-behavioural therapy to treat insomnia, relaxation techniques were also discussed and encouraged (but not monitored), and this could have contributed to the reduction in anxiety directly (rather than mediated through a reduction in insomnia). In addition, Perlman et al.'s participants had comorbid psychiatric problems and were recruited from a mental health clinic, while our participants were deemed to have subclinical anxiety or stress and were recruited from the general population of people with chronic insomnia; thus, our participants may have had lower levels of anxiety to begin with.

Belleville, Cousineau, Levrier, and St-Pierre-Delorme (2011) conducted a meta-analysis of effects of CBT for insomnia on anxiety and found an overall small to moderate effect size (0.406). Belleville et al. also found lack of consistency in the assessment of anxiety (some studies measured anxiety at one point in time while others measured before and after treatment) and great variability in the anxiety instruments used—some measured anxiety, while others measured arousal, stress or worry. We measured both anxiety and stress in our study and found that the *DASS-21 Stress* subscale seemed to have better

captured the distress felt by our participants than the anxiety subscale. Participants had higher severity of stress than anxiety: almost 50% of participants had moderate, severe or extremely severe stress at baseline, whereas around 30% of participants scored in these categories on the anxiety subscale. Indeed, Brown, Chorpita, Korotitsch, and Barlow (1997) found that the stress subscale was a measure of general negative affect, distress, and worry, and perhaps this was more indicative of our study participants, who reported 'lying awake at night worrying'. In addition, while some studies have linked insomnia to a heightened arousal system (Morin et al., 2003; Vgontzas et al., 1998), other have linked it to anxiety disorders (Jansson & Linton, 2006b; Ohayon & Roth, 2003). Given the current theories of insomnia and physiological arousal (e.g. Bonnet & Arand, 2010; Riemann et al., 2010), it is plausible that insomnia, anxiety and stress share the same underpinning of physiological arousal. In this case, questions then arise regarding any differences between insomnia associated with stress and insomnia associated with anxiety disorders, and if the 'anxiety' component of treatment should differ in these cases? To our knowledge no studies have specifically investigated this issue. Kohn and Espie (2005), however, did investigate sensitivity and specificity of measures in discriminating between insomnia associated with depression (and co-morbid anxiety in most cases), psychophysiological insomnia, and good sleepers. They found that the insomnia groups did not differ in terms of sleep hygiene practices (both equally poor), mental arousal, and sleep-related stimulus control, but the group with co-morbid depression had higher self-reported physiological arousal.

Both treatment conditions reduced dysfunctional sleep beliefs and improved participants' quality of life, as evidenced by the large effect sizes of our treatments and the continued improvement from end of treatment to the follow-up period. It is largely recognised that insomnia negatively affects people's quality of life (Léger & Bayon, 2010) and the few studies that include this domain as part of outcome measurement report significant improvements (e.g., Van Houdenhove, Buyse, Gabriels, & Van den Bergh, 2011; I. H. Verbeek et al., 2006). Our study adds to this small literature by demonstrating that the effects of treating insomnia and anxiety extend beyond improvements in sleep and provide further support for the need to increase awareness and dissemination of insomnia treatments.

Our study had a number of limitations. First, the design could have been improved by the addition of a waitlist control group and an insomnia-only treatment group. Second, while we used a slideshow presentation to ensure that the therapists did not diverge from the manual content during sessions, we had no independent rater verifying the content of our sessions across groups and therefore we cannot completely rule out that treatment delivery may have differed across the five groups even with largely the same therapists. Thirdly, of course, those therapists could not be blind to treatment condition, and therapist expectations are known to be important to treatment outcomes (Lambert, 2004). While the therapists had no preconceived beliefs about which would be the more effective combination of treatments we cannot entirely rule these factors out. Fourth, despite our efforts in randomising participants to each treatment condition, there were still significant differences between groups in one of the sleep diary variables and this could have accounted for the differences

in results between groups for this variable. Fifth, and perhaps most importantly, while our sample size was big enough to warrant a careful analysis, the current study was essentially a pilot study and a large sample would have been beneficial. Our sample size was likely too small to detect subtle differences between groups and we cannot be confident these findings would generalise. Finally, we could have utilised a more extended baseline measurement as well as a longer follow-up period.

This study provides further support for the argument that both anxiety reduction and sleep should be targeted in interventions aiming to treat insomnia. A strong argument would now have to be made for why *not* to include both of these components in any future insomnia treatment studies. Future clinical trials should continue to examine the most effective combination of these treatments. Meanwhile, there is already sufficient evidence to conclude that clinicians should directly target stress and anxiety in addition to sleep in order to provide the most effective treatment package for insomnia.

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DRC 16

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STATEMENT OF CONTRIBUTION
TO DOCTORAL THESIS CONTAINING PUBLICATIONS

(To appear at the end of each thesis chapter/section/appendix submitted as an article/paper or collected as an appendix at the end of the thesis)

We, the candidate and the candidate's Principal Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of Candidate: Fernanda de Lacerda Mottin

Name/Title of Principal Supervisor: Dr Duncan Babbage

Name of Published Research Output and full reference:

de Lacerda Mottin, F., Babbage, D. R., & Leathem, J. M. (Manuscript being prepared for submission.) Cognitive-behavioural group therapy for anxiety-related insomnia.

In which Chapter is the Published Work: Chapter Three

Please indicate either:

- The percentage of the Published Work that was contributed by the candidate:

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  Candidate has prepared the full draft of manuscript and supervisors' comments and input to the manuscript have been to the same of extent as the usual thesis chapter supervision input.

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Paper Three:

Experiences of a group treatment for anxiety-related insomnia: A series of *n* = 1 case studies

Note:

This chapter is presented in a manuscript format and it is intended to submit this manuscript for peer-review and possibly publication. Other manuscripts are referenced as chapters for this thesis only.

Running head: *Experiences of a group treatment for anxiety and insomnia*

Experiences of a group treatment for anxiety-related insomnia: A series of *n* = 1 case studies

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Key words: insomnia; sleep; anxiety; arousal; psychological treatments; insomnia; cognitive-behavioural therapy; cognitive therapy; behavioural therapy; CBT; case study; qualitative analyses.

Abstract

Objectives: Insomnia affects a large number of people and its effects go beyond sleep deficits, resulting in an overall decrease in quality of life. Anxiety-related cognitions and behaviour have been implicated in the development and maintenance of insomnia but are not consistently targeted in insomnia treatments. This study investigates how participants receiving group therapy for anxiety and insomnia at a university psychology clinic responded to the addition of the anxiety component of the programme evaluated.

Methods: This paper presents a series of case studies of a subsample of six people with insomnia who were amongst 28 group therapy participants who sought treatment at a psychology clinic, selected according to their level of anxiety and stress (high stress and anxiety; low stress and anxiety; high stress and low anxiety). Their perception of the inclusion of an anxiety focus in the treatment programme was examined and the impact of different levels of anxiety and stress on their treatment responses was assessed using a combination of a repeated measures $n = 1$ case study design and qualitative thematic analysis.

Results: Anxiety treatment was seen to be beneficial to participants both through self-report instruments and participants' accounts of their experiences.

Conclusion: Anxiety treatment is beneficial for insomnia and for other aspects of people's lives. Treatment received in group format seemed to increase motivation to homework compliance while the groups were taking place. The paper concludes with a discussion about factors that may have influenced participants' adherence to the treatment rationale and treatment interventions.

Experiences of a group treatment for anxiety-related insomnia: A series of *n* = 1 case studies

According to prevalence studies, insomnia is a condition that affects 33% of people in its broadest definition and 7% using the more strict DSM-IV criteria (LeBlanc et al., 2009; Ohayon, 2002; Ohayon & Roth, 2003). Similarly, in a study across seven European countries involving 25,579 individuals, Ohayon and Reynolds (2009) found that insomnia complaints at the symptom level (difficulty initiating or maintaining sleep and non-restorative sleep at least 3 nights per week) affected one-third of their sample whereas at the diagnostic level about 6% met DSM-IV criteria. In New Zealand, it is estimated that 25% of people suffer from chronic sleep problems (Paine, Gander, Harris, & Reid, 2004), indicating that chronic sleep problems affect a similar proportion of the population worldwide. Despite the smaller prevalence rate at the diagnostic level, chronic sleep problems in general affect a significant proportion of people and its consequences extend well beyond the amount of sleep one gets and daytime impairments in the immediately following day. Insomnia adversely impacts on people's subjective well-being (as measured by positive and negative affect; Hamilton et al., 2007), cognitive functioning (Fortier-Brochu, Beaulieu-Bonneau, Ivers, & Morin, 2012), and mental health (Baglioni et al., 2011; Johnson et al., 2006; Perlis et al., 2006), and is a risk factor for chronic headache (Ødegård et al., 2011), cardiorespiratory fitness (Strand et al., 2013), and acute myocardial infarction (Laugsand, Vatten, Platou, & Janszky, 2011). Furthermore, untreated insomnia can be very costly to society (Daley, Morin, LeBlanc, Gregoire, & Savard, 2009; Léger & Bayon, 2010; Scott et al., 2011).

Psychological treatments for insomnia (e.g., cognitive-behavioural therapy; CBT) have been found to be effective in alleviating insomnia symptoms (Morin et al., 2006; Murtagh & Greenwood, 1995) and about 60% of people achieve clinically significant improvement in measures of quantitative sleep parameters following CBT for insomnia (Edinger et al., 2001; Lichstein et al., 2000; Morin, Colecchi, Stone, Sood, & Brink, 1999; Perlis et al., 2000). The majority of treatment packages target dysfunctional sleep-related behaviours and cognitions through the use of sleep hygiene, sleep restriction, stimulus control, and cognitive restructuring, and a number of studies also address physiological arousal by adding relaxation techniques to treatment packages (Espie et al., 2001; Morin et al., 2006; Wang, Wang, & Tsai, 2005). A growing body of literature has indicated that anxiety is a significant factor in the etiology of insomnia (Espie, 2002; Espie et al., 2006; Jansson & Linton, 2006a; Lundh & Broman, 2000), but few treatment studies directly target anxiety—and in particular anxiety-related cognitions—when treating insomnia (Espie et al., 2001; Ong et al., 2008).

The addition of anxiety-related interventions is beneficial for the treatment of insomnia both from a research and clinical perspective. When a client's chief complaint is insomnia and the clinician identifies that anxiety-related behaviours and cognitions also contribute to the presenting problem, it makes sense to target these additional factors in therapy. This would ensure that the treatment is successful in reducing the insomnia symptoms and the associated distress, as well as preventing the problem from re-occurring. In examining the separate contributions of acceptance of treatment rationale and homework compliance to change (i.e., improvement) and outcome in the

treatment of depression, Addis and Jacobson (2000) found that both variables independently contributed to within-treatment change and outcome. Similarly, Westra, Dozois, and Marcus (2007) found that in a group treatment for anxiety disorders using CBT, client-rated expectation of change led to early treatment change through an increase of homework compliance; in turn, early treatment change mediated the relationship between homework compliance and treatment outcome. Given that treatment adherence and homework compliance appear to be significant factors in ensuring a successful outcome, we questioned whether people with chronic insomnia and sub-clinical anxiety would accept the rationale for a treatment that targeted both insomnia and anxiety.

The efficacy of a combined group CBT treatment for anxiety and insomnia was examined in the previous chapter (Chapter Three) and significant improvements for the participants on measures of sleep, insomnia severity, anxiety, and stress were found. At intake, participants reported more problems with stress than anxiety as measured by the Depression Anxiety Stress Scales–21 item version (DASS-21; Lovibond & Lovibond, 1995). It has been suggested that the anxiety and stress subscales of the DASS-21 measure different constructs, in that the anxiety subscale focuses on the *physiological arousal* aspect of anxiety while the stress subscale focuses on the *cognitive arousal* aspect of anxiety (Belanger et al., 2004; Gloster et al., 2008). Given the previous study's findings, the current study had two aims: 1) to identify whether different levels of anxiety and stress impacted on participants' treatment response (quantitative change); 2) to investigate, at the individual level, how the group therapy study participants perceived the inclusion of anxiety in the treatment of

their insomnia (qualitative change). More specifically we attempted to answer two research questions:

1) Would all group therapy participants find the anxiety interventions helpful?

2)What is the impact of differing levels of anxiety and stress on treatment outcome?

Method

Design

The current study follows a repeated measures $n = 1$ case study design for each case study participant, combined with a qualitative thematic analysis for the participants' interviews.

Participants

Individual case study invitees were amongst a wider group of participants attending the cognitive-behavioural group treatment for insomnia at the Massey University Psychology Clinic across a ten month period. Selection criteria was defined according to participants levels of anxiety and stress because of the variability in these scores seen in group therapy participants and because most participants scored higher on stress than anxiety. Invitations to previous group attendees to participate in the current study were extended to: 1) the two attendees with the highest overall mean of their anxiety and stress scores (high stress and anxiety); 2) the two attendees with the lowest overall mean anxiety and stress score (low stress and anxiety); and 3) the two attendees with high stress in addition to the highest difference between their stress and anxiety scores (high stress and low anxiety). Because participants did not commonly

experience high anxiety and low stress, this was not part of the selection criteria. All six of the participants meeting these criteria agreed to participate in the current study.

Participant A was male, employed, aged 44 years; Participant B was female, unemployed, aged 59 years; Participant C was female, a post-graduate student, aged 43 years; Participant D was female, employed, aged 60 years; Participant E was female, employed, aged 58 years; and Participant F was female, retired, aged 75 years. Participants A and C received the insomnia intervention first while the others received the anxiety intervention first. Participant A, C and D had a subthreshold baseline score on the Insomnia Severity Index. However, participants A and D took longer than 30 minutes to go to sleep when they first went into bed, or to go back to sleep if they woke up during the night. Due to this and their level of distress regarding their sleep, they had been accepted into the sleep treatment group. Participant C reported significant stress about her sleep pattern despite seemingly normal sleep patterns.

Overall, case study participants had an average Insomnia Severity Index score of 15 (SD = 5.34) whilst the average score of participants in the main study was 17 (SD = 4.12).

Measures and materials

All participants selected for these individual case studies had already completed self-report measures of insomnia, sleep, anxiety, and stress as part of a wider evaluation of the group therapy programme. The only procedural difference for the individual case study participants compared to the remainder of the group therapy participants was that the case study participants took part

in an extended interview as part of their follow-up; group therapy participants took part in a short follow-up interview when possible, or simply responded to the questionnaires via mail.

The results of these case studies are focussed on the *sleep diary* and the *Insomnia Severity Index* given we were interested in investigating how the differing levels of anxiety and stress impacted on participants' insomnia. The *Depression Anxiety Stress Scales—21 items* was used only to guide case study participant's selection, and although it was also used as an outcome measure in the main study, its results are only briefly reported here.

A *Sleep Diary* (Morin & Espie, 2003) was used as a measure of participants' accounts of sleep. It provided accounts of sleep onset latency, time awake after sleep onset, total sleep time, total time in bed, sleep efficiency, and sleeping pill use. Despite being a subjective account of sleep, various formats of sleep diaries have been widely used as outcome measures in insomnia research (Edinger et al., 2009; Morin et al., 1994; Ong et al., 2008) and its use is recommended as part of standard assessment in insomnia research (Buysse, Ancoli-Israel, Edinger, Lichstein, & Morin, 2006). Despite a lack of reliability data available for this instrument, researchers of the field are making progress towards standardisation of sleep diaries that will enable further reliability and validation studies (Carney et al., 2012).

The *Insomnia Severity Index* (ISI; Morin, 1993) is a 7-item questionnaire that uses 5-point Likert scales to assess clinical caseness and severity of insomnia. The *Insomnia Severity Index* has been widely used as an outcome measure for insomnia treatment. It has good overall internal consistency (Cronbach's Alpha = 0.74) and is sensitive to changes over time through

correlation with changes in polysomnographic data (Bastien et al., 2001; Morin et al., 2011). In addition to healthy populations its use has been validated in health populations such as with cancer patients (Savard et al., 2005). Categories of severity are: non-clinical, subthreshold, moderate, and severe.

The *Depression Anxiety Stress Scales—21 items* (Lovibond & Lovibond, 1995) is the short version of the full 42 item DASS, and like the longer measure is presented as a 4-point Likert scale questionnaire. All the scales have adequate construct validity and good internal consistency (.88 for Depression, .82 for Anxiety and .90 for stress; Henry & Crawford, 2005). A study with older adults also showed evidence of good convergent validity: r = .76 for depression subscale with BDI-II, r = .74 for anxiety subscale with BAI, and r = .74 and r = .57 for stress subscale with the Positive and Negative Affect Schedule-Negative Affect Scale and the Penn State Worry Questionnaire, respectively (Gloster et al., 2008). Similar results were also obtained in a study across four ethnic groups in the United States (Norton, 2007). Categories of severity are: normal, mild, moderate, severe, and extremely severe.

Procedure

The case study interviews took place as part of the follow-up assessment for the group therapy study. Due to time constraints only participants in four out of the five therapy groups were eligible. Participants invited for the individual case studies signed the Consent Form at this follow-up interview, which was scheduled about three months after the end of treatment. During the interview participants were asked general questions about how they had been feeling in terms of anxiety, stress, and insomnia since the end of treatment. The interviews were loosely structured to allow for participants to provide their own

accounts of what was important for them and if not mentioned, specific questions regarding usefulness of interventions, order of interventions, adherence to interventions, and overall benefits of the treatment were also asked. Interviews lasted between 45 and 75 minutes.[7]

Planned analyses

To identify whether anxiety and stress levels impacted on treatment response, it was intended to analyse measures of sleep and insomnia severity through visual inspections of the mean scores over time, to identify any distinguishing patterns across the three participant pairs (see "Quantitative change" below).

To investigate participants' experiences of treatment interventions, a thematic analysis approach (Braun & Clarke, 2006) was used to categorise participants' comments during the follow up interview and identify common threads across participants responses (i.e., a realist account—as opposed to a constructionist approach, where the themes are viewed as a derivation from a socio-cultural context rather than individual perspective). The analyses were kept to a *semantic* level, where patterns of semantic content were organised, summarized, and discussed in terms of their implication to the broader literature (Braun & Clarke, 2006; see "Qualitative change" below).

Results

Quantitative change

Participants' scores on measures of sleep and insomnia severity are displayed on Figure 9 through to Figure 11, and grouped according to the criteria

[7] Case study information can be found in Appendix A.

for selection into this follow-up study. The results discussed below are similar to those found in the main study. Because this study's aims concerns participants' overall response to treatment, mid-treatment scores are not discussed here and the results reported focus on pre- and post-treatment scores as well as follow-up scores.

Participants A and B had low anxiety and stress scores at baseline—these people were attending the group primarily for assistance with primary insomnia symptoms. Participant B received the anxiety intervention first and Participant A received the insomnia intervention first. See Figure 9 below for their quantitative progress across treatment.

Participant A had an initial insomnia severity score of 12, spent an average of 83 minutes awake during the night, and had a sleep efficiency score of 77%. At follow-up he showed consistent improvement, with an insomnia severity score of 4, a sleep efficiency score of 84%, and he spent 52 minutes awake during the night. His sleep onset latency scores remained relatively unchanged and within the normal limits.

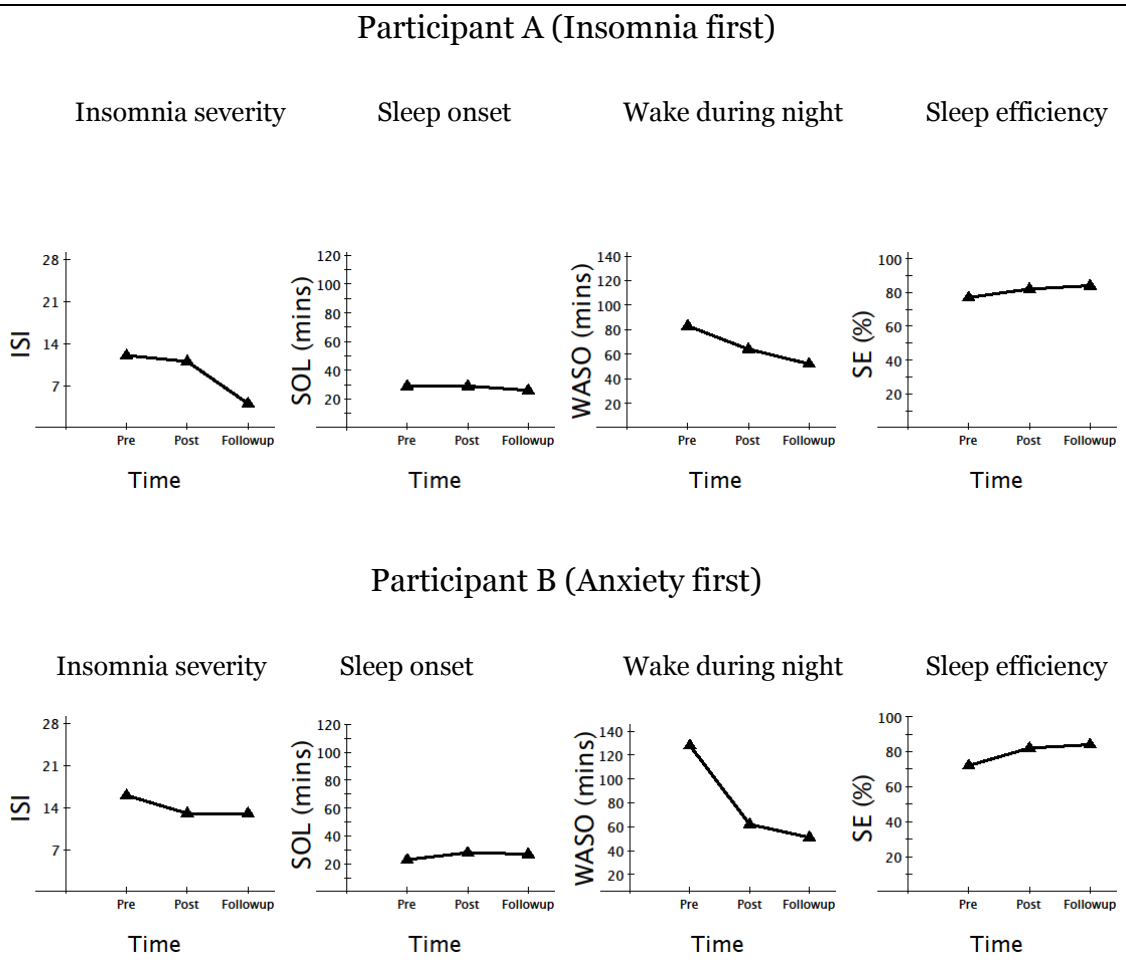

Figure 9. Sleep and insomnia severity scores for participants A (Insomnia first) and B (Anxiety first). These participants had low anxiety and stress scores. Sleep efficiency is an indicator of the percentage of time spent asleep after a person went to bed with the intent of sleeping and higher percentage indicates better scores. ISI: Insomnia Severity Index; WASO: Time awake after sleep onset; SOL: Sleep onset latency; SE: Sleep efficiency.

At the beginning of treatment participant B spent just over 2 hours awake after sleep onset and had a sleep efficiency score of 72%. At follow-up this participant improved to an average of only 51 minutes awake after sleep onset and with a sleep efficiency score of 84%, with sleep onset latency essentially unchanged at a slight increase of 4 minutes, although it was still less than 30 minutes. Her insomnia severity score decreased from 16 at baseline to 13 at

follow-up. Both participants continued to experience low levels of anxiety and stress at follow-up.

Although most of these two participants' scores seem comparable at follow-up, participant B had a stable insomnia severity score between the end of treatment and follow-up, while participant A had a sharp decrease in this score during the same period. Participant B mentioned during the follow-up interview that the stimulus control intervention was extremely helpful for her, but she stopped using it once the group finished. She also mentioned that if she had received the sleep interventions first she may have had more chance to establish the stimulus control as a habit before the end of treatment (and therefore being more likely to sustain or continue with the improvement). Participant A commented that he was "being disciplined" in following the behavioural sleep intervention (stimulus control) since the end of treatment and had also decreased his alcohol consumption. From the body of prior research it is reasonable to conclude that this contributed to his continued improvement between end of treatment and follow-up.

Both participants commented that the anxiety interventions were helpful, although for Participant B this was more evident for her when her particular situation was used as an example during a session. Participant A indicated he saw the benefit of anxiety treatment in other aspects of life (i.e., other than sleep) but he also saw how his experience of insomnia and anxiety were related, and he said he found this helpful to understand.

Participants C and D had high stress and low anxiety scores at baseline. Participant C received the insomnia intervention first and Participant D

received the anxiety intervention first. See Figure 10 below for their quantitative progress across treatment.

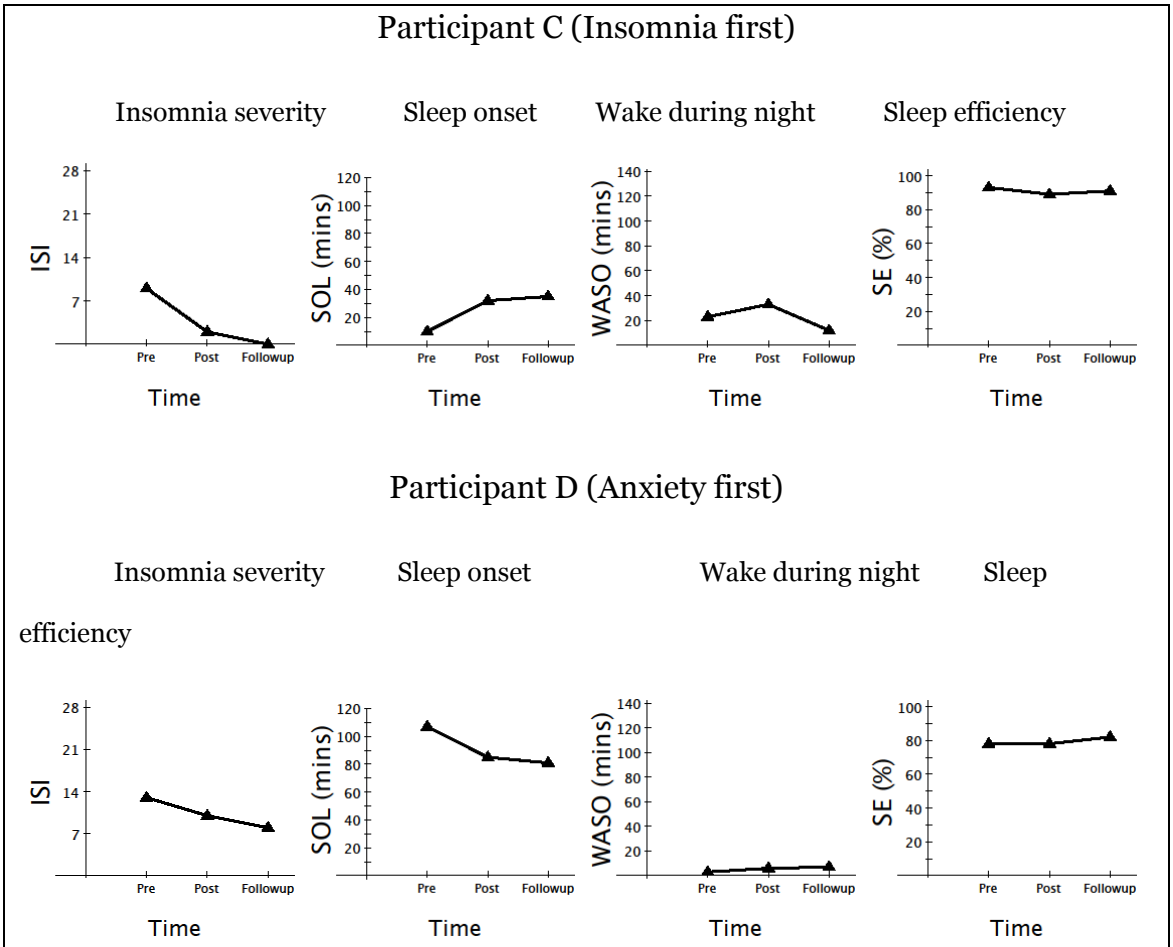

Figure 10. Sleep and insomnia severity scores for participant C (insomnia first) and participant D (anxiety first). These participants had high anxiety and low stress scores. Sleep efficiency is an indicator of the percentage of time spent asleep after a person went to bed with the intent of sleeping and higher percentage indicates better scores. ISI: Insomnia Severity Index; WASO: Time awake after sleep onset; SOL: Sleep onset latency; SE: Sleep efficiency.

At follow-up participant C's score on the Insomnia Severity Index was reduced to zero, from a subthreshold score of nine at the beginning of treatment. Her sleep onset latency increased from 10 minutes at baseline to 35 minutes at follow-up, but her perception of sleep difficulties indicated improvement. In other words, in terms of more 'objective' sleep self-reports her

sleep was worse, but she rated her insomnia as less severe. In addition, her sleep efficiency scores remained relatively unchanged, from 93% at the beginning of treatment to 91% at follow-up—a score still above the recommended 80-84%. This could mean that for this participant, her *satisfaction* with her sleep pattern was more important than the *actual* sleep pattern. In fact, she mentioned during the follow-up interview that she now believed that her anxiety was "the root" of her "sleep problem". Therefore, for this participant, her sleep had been a concern, so long as anxiety was of concern for her.

Participant D had an initial insomnia severity score of 13, a sleep onset latency score of 107 minutes, and a sleep efficiency of 78%. At follow-up her insomnia severity score reduced to 8, her sleep onset latency decreased to 81 minutes, and her sleep efficiency increased to 82%. While she continued to take a significant amount of time to go to sleep, she perceived it to have little impact on her functioning. She mentioned the anxiety sessions were "quite helpful" for many aspects of her life, and she said she saw the improvement in how she coped with the daytime effects of insomnia. She also noted how, in comparison with her past, she is now better able to "accept" the feeling of anxiety—instead of avoiding it—because when growing up she believed "it was not acceptable to be anxious—you are weak so you try and hide of [sic] from everybody…" Perhaps as a result of improvement in her overall experience of anxiety, this participant said that after the end of treatment she felt only "aroused" (i.e., alert) but not "anxious or worried" when she went to bed. She felt however that she "took second best" because she did not improve in terms of her sleep as much as she had expected.

In terms of their anxiety and stress levels, both participants experienced normal levels of anxiety and stress at follow-up, although participant C had severe stress at baseline and participant D had mild stress.

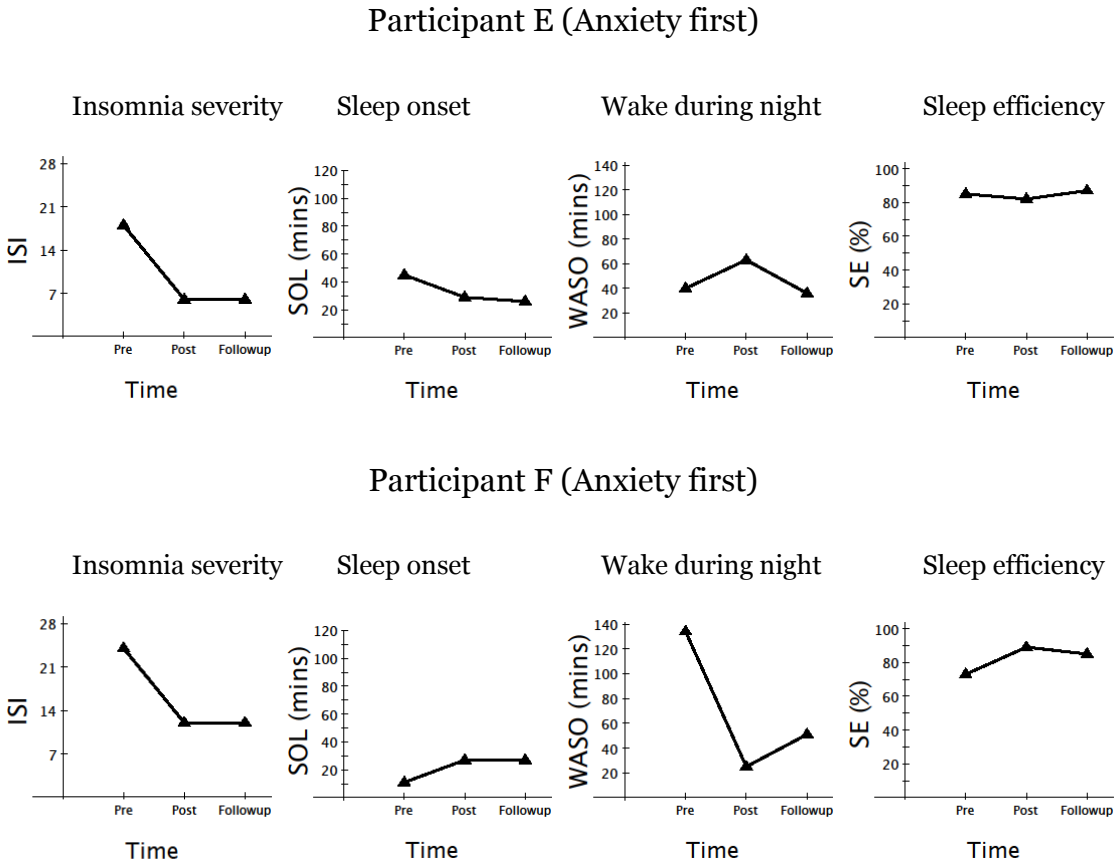

Figure 11. Sleep and insomnia severity score for participants E and F (anxiety first). These participants had high anxiety and stress scores. Sleep efficiency is an indicator of the percentage of time spent asleep after a person went to bed with the intent of sleeping and higher percentage indicates better scores. ISI: Insomnia Severity Index; WASO: Time awake after sleep onset; SOL: Sleep onset latency; SE: Sleep efficiency.

Participants E and F had both high anxiety and high stress scores at baseline. They both received the anxiety intervention first. See Figure 11 above for their quantitative progress across treatment.

Participant E had an initial insomnia severity score of 18, and took an average of 45 minutes to go to sleep, spent 40 minutes awake on average during

the night, and had a sleep efficiency of 85%. At follow-up her insomnia severity score decreased to 6, she took 26 minutes to go to sleep and her sleep efficiency slightly increased to 88%. The time she spent awake during the night slightly decreased to 36 minutes. She commented that it was only after the group therapy that she realised the impact that her anxiety had on her sleep and her life in general. She said that since the groups she had been dealing with anxiety and stress "a lot better" and people around her noticed positive changes in her.

Participant F had a baseline insomnia severity score of 24, spent an average 134 minutes awake during the night, and had a sleep efficiency of 73%. At follow-up her insomnia severity score decreased to 12, she spent an average 51 minutes awake during the night, and her sleep efficiency increased to 85%. Her sleep onset latency increased from 11 minutes at baseline to 27 minutes at follow-up, although it still remained within the recommended 30 minutes time frame. She also commented that both interventions were helpful and benefitted other aspects of her life—not just sleep. She said that although she still felt anxious in several situations, she felt more prepared to cope with the anxiety and showed less avoidance of anxiety-provoking situations. Both participants experienced normal levels of anxiety and stress at follow-up in comparison to extremely severe levels of anxiety and severe levels of stress at baseline.

Qualitative themes

The content of the follow-up interviews was categorised according to five themes: helpful interventions, order of interventions, benefits from therapy, intervention as a group, and after the group.

Helpful interventions

The most helpful interventions mentioned were psychoeducation about sleep and post-treatment relapse, and completion of thought records for anxiety cognitions. Although Participant B initially did not think anxiety was particularly relevant to her insomnia, she said that in using her own example to work through the thought record during one of the sessions, she saw the benefits of addressing anxiety in general. Through discussing her example of being afraid of going to the top of the mountain when skiing, this participant said that talking about anxiety in the group became relevant because "it was *my* anxiety."

Sessions providing greater knowledge about sleep were described as helpful to normalise participants' experiences of insomnia as they became aware of the variability of what is considered a "normal" sleep pattern. They also found relief in knowing set-backs were part of continued improvement; Participant D said, "… so now this morning instead of being pissed off I can say well, it's just my setback and it doesn't have to happen again, rather than being pessimistic."

Order of interventions

Only two participants (C and B) commented on the order of interventions. Participant C found the anxiety sessions more relevant as she saw that anxiety was "the root" of her sleep problem. She enjoyed having the knowledge from the insomnia sessions (which she received first) but did not find the sleep-focussed behavioural strategies so relevant. Participant B received the anxiety intervention first and suggested the reverse order might have been better for her. As previously mentioned, she said she believed she might have

increased her chances of establishing the new habit of getting out of bed if not asleep within 20 minutes (i.e., stimulus control instructions) before the end of the group.

Benefits from therapy

Four participants said their post-treatment sleep was "pretty good" and that they were happy with their new pattern. One participant described her pattern as still erratic, while another said it was good until two days prior to the interview. Most of the benefits related to increased awareness of anxious cognitions, their ability to cope with anxiety and stress, and understanding how anxiety and stress can affect their sleep. Participants felt more relaxed overall and less anxious about falling asleep or waking up during the night. Some also spontaneously stopped taking sleeping pills and started doing more things for themselves (e.g., socialising or exercising). A number of participants considered being able to cope with anxiety and stress a great breakthrough. Participant D said, "I'd like to think it helped me a lot with anxiety in a lot of situations and it was okay to be anxious. It was a really powerful thing for me [...] it was okay to be anxious in front of other people, I didn't have to be fearful and hide." Participant E said, "I can't believe I am feeling this way, it's great! I used to take in all [their] worries and problems." Another participant also commented that completing sleep diaries raised his awareness of how much alcohol he was drinking and he cut down on his alcohol consumption as a result.

Group-based intervention

Participants viewed the group as a means to see they were not alone in their experience of insomnia. Participant A said that, "Doing the sessions I got

insight that not just myself, but there are other people who have these issues, insomnia and anxiety that may affect their sleep pattern and I have probably not been as hard on myself as a result." The group format also provided motivation for participants to follow through with the strategies discussed in session. One participant said that "it was about commitment" and "being part of the group meant this was my homework so I do it. I guess it's sabotaging myself and the group if I don't do my part." Another participant said that she felt "quite bereaved" when the group finished. At the same time this participant acknowledged how difficult it was to even experience anxiety in front of the group and being part of the group helped her realise that there were other ways to deal with anxiety than hide it. Participant C also experienced stress about talking in front of the group, but she "benefitted from hearing other people's thoughts and their progress was also encouraging. So I made myself do it because of the benefits. I felt better after doing it, just very anxious inside."

Post-group progress

Most participants said they needed to practice the strategies more, such as getting up when not asleep and practicing relaxation. They described the follow-up interview as helpful because it enabled them to think about their sleep patterns and their use of strategies discussed during the group. One participant suggested that the follow-up session could be a routine part of the group programme to increase motivation and adherence to treatment strategies. Two participants also commented that they still had difficulty with sleep (not 100% better) and in their case they felt aroused or alert at night but not necessarily anxious or stressed. For them, focusing on their alertness (and time spent awake) prevented them from seeing how much they had improved and in

discussing their sleep patterns during the follow-up interview they realised their sleep was better than at the beginning of the group.

Discussion

The first research question was "Would all group therapy participants find the anxiety interventions helpful?" The evidence through the participants' accounts of how the treatment interventions improved their experience of anxiety indicated the intervention was helpful.

The second question was "What is the impact of differing levels of anxiety and stress on treatment outcome?". The interventions were found to be generally effective although in two cases the evidence was mixed. One participant reported no concern with insomnia severity at follow-up despite having an increase in sleep onset latency. The other participant reported she still took a long time to fall asleep (sleep onset latency) but her experience of insomnia severity had overall improved, particularly because of the anxiety interventions. It also appeared that participants with higher levels of stress—alone or in combination with anxiety—benefitted the most from this combined anxiety and insomnia treatment. While two participants with low anxiety and stress reported less benefits from the anxiety sessions, another participant in this category found the anxiety treatment beneficial.

Discussing anxiety came as a surprise to some participants, because their main complaint was of insomnia and they did not see themselves as particularly anxious people. However, they showed interest in the topic and found it easy to engage with the group material as they saw it as still applicable to their circumstances. Early involvement in treatment through homework compliance

mediates initial treatment gain in CBT for anxiety and this initial gain mediates treatment outcome (Westra et al., 2007). Acceptance of treatment rationale and compliance with homework also uniquely contribute to the outcome of CBT for depression (Addis & Jacobson, 2000). This seems to be true for these case study participants where most mentioned increased awareness of and coping with anxiety as a benefit from the group therapy. This was unlikely to have happened if participants had not accepted the rationale and engaged with treatment. Participants also mentioned it was encouraging to hear other people's accounts of improvements.

Looking specifically at insomnia, Constantino et al. (2007) found that therapeutic alliance predicted outcome whereas confrontational interactions were more likely to lead to dropout. These findings highlight that although it is important to promote treatment rationale, therapeutic alliance must receive continued attention throughout therapy, in particular where group therapy is concerned. For instance, although one participant experienced anxiety about sharing progress/thoughts in session, she did not feel pressured by the therapists to do so. It is likely that the therapists' attitude alleviated her distress and facilitated her engagement with the group.

A number of the participants suggested that they needed to increase or continue to use the strategies learned in the groups in the face of relapse or slow improvement. Harvey, Inglis, and Espie (2002) found that home use of cognitive restructuring and stimulus control and/or sleep restriction were the best predictors of outcome. For our participants, being in the group and having made a commitment increased motivation to homework compliance while the groups took place. Perhaps, then, having booster sessions after the end of

treatment could have increased compliance with treatment components after the end of therapy. Alternatively, booster sessions could be offered to participants who still experienced significant problems with insomnia. Clarke, Rohde, Lewinsohn, Hops, and Seeley (1999) found that adolescents who underwent group CBT for depression, benefitted from booster sessions when depressive symptoms were still present at the end of treatment. Further studies could investigate the differential effects of booster sessions in the group treatment of insomnia.

Some participants mentioned discontinuing the use of sleeping pills even though this topic was not formally addressed in the group therapy programme. Therapists took a neutral stance on this question and recommended consultation with the prescribing doctor. Morin, Bélanger, Bastien, and Vallières (2005) found that CBT for insomnia combined with a tapering regime produced the lowest rates or relapse of benzodiazepine intake 24 months post-treatment. Our study's follow-up time was short in comparison and the long-term effect of our treatment on sleeping pill use is unknown. However, it seems that directly addressing the use/discontinuation of sleeping pills could have been beneficial, especially for participants who were particularly concerned about the long term effects of sleeping pill use.

Treatment order did not seem to be a particular issue for most of our participants although one person in the anxiety-first group specifically noted that she thought she might have benefitted from having spent more time focusing on the sleep strategies across the eight sessions. Despite this, our analysis of the overall group outcomes (described in Chapter Three) found that receiving anxiety treatment first was on average more beneficial to participants

at post-treatment and to a lesser extent at follow-up than receiving insomnia treatment first. While promoting acceptance of the treatment rationale may help (as discussed above), some degree of individualisation of treatment might have been beneficial to enhance motivation and treatment compliance. Further research could investigate the specific mechanisms and benefits of treating anxiety first and whether these could be combined with sleep interventions, in a mixed approach rather than a sequential approach.

One participant who had extremely low scores for anxiety and stress at the beginning of treatment still reported improvements in anxiety and reported that he perceived his insomnia and anxiety to be related. His experience appeared to have not been adequately captured by the instruments utilised, but raised an interesting question: at the individual level, how much weight is given to quantitative versus qualitative improvements? A number of reasons could explain the discrepancy between his statements during the interview and his answers on the questionnaires. For instance, the actual items on the questionnaires may not have matched his experience of anxiety, or he may not have wanted to disclose his anxiety through the questionnaires, thus underreporting his concerns. At the outset, this participant had been contacted by the first author regarding his low levels of anxiety and stress, as we were questioning whether he fit the inclusion criteria for the treatment group. The participant was surprised to hear that, as he believed he had important issues with anxiety and he was clear he still wanted to go through with treatment.

The current study also had a number of limitations. First, the selection criteria took into account participants' levels of stress and anxiety, but not the intervention received (*Insomnia first* or *Anxiety first*). If the selection criteria

had also taken into account the order of the intervention received, comparisons between participants who received each intervention would have been possible. Not only would this have mirrored the approach taken in the main study, it might also have provided richer material for the qualitative analysis. Second, while all interviews focussed on the same general areas and questions, the interviews did not use an exhaustive structured questionnaire. It is possible that some aspects of participants' experience were not disclosed during these interviews. Finally, this study is a small qualitative study that examined the experienced of a certain number of people who underwent a specific treatment programme. Therefore, direct generalisation of these results to other samples is not possible.

Notwithstanding the limitations described above, overall, the results from this study suggest that anxiety treatment is indeed beneficial for insomnia and also for other aspects of people's lives. We suggest that treatment of insomnia may not be complete in many cases unless anxiety is also targeted, a view also increasingly supported by other researchers (e.g., Carney & Edinger, 2010). From the accounts of the participants in this study, the benefits of the group therapy extended well beyond improvements in sleep and anxiety, providing support for the conclusion that when jointly targeted, treatment of insomnia and anxiety result in significant changes in overall quality of life. To optimise treatment effects, it seems that the rationale for interventions should be sufficiently understood (i.e., "buy-in") and opportunities to individualise interventions should be used to maximise treatment adherence and improvement.

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DRC 16

MASSEY UNIVERSITY
GRADUATE RESEARCH SCHOOL

STATEMENT OF CONTRIBUTION
TO DOCTORAL THESIS CONTAINING PUBLICATIONS

(To appear at the end of each thesis chapter/section/appendix submitted as an article/paper or collected as an appendix at the end of the thesis)

We, the candidate and the candidate's Principal Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of Candidate: Fernanda de Lacerda Mottin

Name/Title of Principal Supervisor: Dr Duncan Babbage

Name of Published Research Output and full reference:

de Lacerda Mottin, F., Babbage, D. R., & Leathem, J. M. (Manuscript being prepared for submission.) Experiences of a group therapy treatment for anxiety and insomnia: A series of n = 1 case studies.

In which Chapter is the Published Work: Chapter Four

Please indicate either:

- The percentage of the Published Work that was contributed by the candidate:

  and / or

- Describe the contribution that the candidate has made to the Published Work:

  Candidate has prepared the full draft of manuscript and supervisors' comments and input to the manuscript have been to the same of extent as the usual thesis chapter supervision input.

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Discussion

In this research a scientist-practitioner's approach was followed in evaluating the development of a group-based psychological treatment for insomnia. Reviewing the literature revealed that anxiety and arousal play a major role in the development and maintenance of insomnia symptoms, yet despite this most of the published psychological treatments for insomnia did not target anxiety and anxious arousal. The current research, then, set out to examine the effectiveness of the group cognitive-behavioural treatment for insomnia developed with the Psychology Clinic that was comprised of strategies to address both anxiety and sleep problems. More specifically, the treatment programme aimed to target maladaptive behaviours and cognitions associated with insomnia as well as maladaptive behaviours and cognitions associated with anxiety and arousal. This treatment was delivered in two different orders to investigate which was the best way to integrate anxiety and insomnia treatments. In addition to quantitative analyses, some of the participants' experiences of going through the treatment programme were examined in greater depth.

The first research question considered whether treatment for anxiety would improve insomnia.

The findings from the critical literature review indicated that anxiety and arousal played a significant role in the development and maintenance of insomnia. It provided compelling evidence for these factors to be included as part of psychological treatments of insomnia. The group therapy study found that, when delivered first, anxiety intervention was followed by significant

improvements in anxiety, stress, insomnia severity, and sleep onset latency. The magnitude of these changes was evidenced by the medium to large effect sizes (from .69 to .93). Targeting insomnia first produced significant improvements in insomnia severity only. Overall, this study showed that targeting anxiety added benefits to the treatment of insomnia, showing superior results when compared to an initial focus on sleep.

The second research question was to determine the best way to combine the treatments for anxiety and insomnia.

Immediately following the end of treatment it appeared that treating anxiety first produced gains over and above those produced by treating insomnia first. However, at the three-month follow-up both interventions produced similar effect sizes in measures of insomnia severity, anxiety, stress, and sleep efficiency. Therefore, it appears that it may simply take more time for the benefits of the anxiety-related sessions to be observed when anxiety was treated second.

The results also suggest that treating anxiety first may act as a buffer against the usual initial sleep loss ensued by interventions such as stimulus control. Participants receiving anxiety treatment first had continuous improvements, with evident gains at the end of treatment. Participants receiving insomnia treatment first worsened in the middle of treatment on measures of time awake after sleep onset and sleep efficiency; thereafter they started to show improvement and these gains are evident at the follow-up period.

From the participants' perspective, discussing anxiety came as a surprise to some of them. Their chief complaint was of insomnia and they did not see

themselves as particularly anxious people (which reflects our selection criteria of *subclinical* anxiety). However, they showed interest in the topic and found it easy to engage with the group material as they saw it applicable to their circumstances. Only one person noted that she thought she might have benefitted from having spent more time focusing on the sleep strategies. (She received the anxiety first intervention.)

How to best combine anxiety and insomnia treatment thus appears to depend on the perspective taken on the issue. Looking only at the end result immediately post-treatment, this research suggests that targeting anxiety initially was more beneficial to the participants, and this was a finding contrary to the initial study hypothesis that the insomnia first intervention would produce better results. However, in the longer term, both treatment conditions seemed to be of comparable efficacy. Examining the outcome trajectory, the anxiety first intervention produced constant improvement, which might be more desirable for both clients and clinicians.

The third research question examined the effectiveness of a group treatment for anxiety and insomnia.

The combined treatments for insomnia and anxiety were certainly beneficial for the study's participants. Improvements in measures of insomnia severity and stress with large and moderate effect sizes, respectively, were observed at follow-up. Moreover, participants also showed improvement in measures of dysfunctional sleep cognitions, quality of life, time awake after sleep onset, and in sleep efficiency. At follow-up, participants experienced an overall reduction of 37% in sleep onset latency and had a 35% decrease in time awake during the night (although 78 % still reported being awake for longer

than 30 minutes during the night). Group participants also had a 41% reduction in *Insomnia Severity Index* scores and 89% of participants were in the *Subthreshold* or *Non-clinical* ranges of this instrument at the follow-up assessment. Taken together, the results of this study indicate that the combined anxiety and insomnia treatment was effective across a wide variety of measures.

A fourth aim was to examine the effects of insomnia treatment on participants' quality of life.

The combined anxiety and insomnia treatment significantly improved participants' quality of life. Many participants reported feeling more able to cope with anxiety. Some participants also spontaneously stopped taking sleeping pills and started doing more things for themselves (e.g., socialising or exercising). The benefits of the combined anxiety-insomnia seemed to extend beyond specific effects at the symptom level and produce changes in different areas of the participants' lives.

Limitations of the current project

This research had a number of limitations. The group therapy study design could have been improved by the addition of sleep only treatment and no treatment (wait list) control groups. Practicalities imposed a time limit for the data collection phase of the research and initial (and unexpected) recruitment difficulties meant that the number of participants for the initial groups (n = 11) was not enough to run control groups. At the same time, interventions for each treatment half were based on well- established interventions that are classified as having first class evidence of efficacy. Thus it was expected that both treatment conditions would be efficacious in treating insomnia; the question was how to best combine the two interventions. Moreover, one of the purposes

of the study was to investigate the *effectiveness* of a combined insomnia and anxiety treatment in the general population, which imposed limits on the experimental manipulation in the study design. Although the results showed large effect sizes for the immediate effect of anxiety treatment on insomnia, the participants later received treatment for insomnia. Therefore, we cannot speculate about the longer term effect of the anxiety intervention in isolation on insomnia symptoms.

Second, while the group clinicians used a slideshow presentation to ensure that they did not diverge from the manual content during sessions, there was no independent rater verifying the content of sessions across groups. It cannot be completely ruled-out that treatment delivery may have differed across the five groups.

Third, despite efforts in randomising participants to each treatment condition, there were still significant differences between groups in one of the sleep diary variables and this could have accounted for the differences in results between groups for this variable.

Fourth, the sample size was small, but the pilot nature of this study and the large changes expected on the main outcome measures mean that the results still make a significant contribution to the literature.

Fifth, a more extended and rigorous baseline measurement could have been utilised to account for spontaneous fluctuation of symptoms. A number of participants had insomnia for several years, so it would be unlikely that insomnia would spontaneously remit at the time of the study. Despite this, significant variability was seen and the degree of fluctuation in symptoms that

characterised the long term course of their insomnia was perhaps underestimated. With a small sample size, this added more error variance than anticipated to the analyses.

The individual case studies also had some limitations. The case study participants were selected according to results on measures of anxiety and stress, and their selection did not take into account the order of the intervention received. Thus, it was not possible to explore all potential perspectives on the issue of how people with differing levels of anxiety and stress responded to each of the treatment interventions. While all interviews focussed on the same general areas and questions, a structured questionnaire was not used for the follow-up interviews. As a result, it is possible that more specific aspects of participants' experiences were not disclosed during those interviews. Additionally, this was a small qualitative study that examined the experiences of a certain number of people who underwent a specific treatment programme. Clearly, generalisation of these results to other populations is not the expected outcome. Nonetheless, the insights gleaned from these participants may prove useful for future clinicians and researchers.

Contributions to the literature

The literature review indicated that the earlier models of insomnia were more behaviourally-based (Spielman & Glovinsky, 1991) and that interventions developed to treat insomnia behaviourally are highly effective treatments (Espie, Lindsay, et al., 1989; Harris et al., 2012; Spielman et al., 1987). Later models have since highlighted the role of dysfunctional cognitions in insomnia (Morin, 1993) and in terms of anxiety, worry, and arousal (Espie, 2002, 2007; Harvey, 2002a, 2002b; Jansson & Linton, 2006a, 2007). An evidence-based

insomnia treatment should incorporate all aspects described in the literature: sleep behaviours, sleep cognitions, physiological arousal, and cognitive arousal. Current published treatment studies, however, vary in the degree of focus on these aspects. The critical review suggested that studies most frequently target sleep and anxiety behaviours, followed by sleep and anxiety cognitions. Furthermore, only 9% of studies reviewed focused on all areas involved in insomnia aetiology.

The group therapy study provided evidence that addressing anxiety in general can improve insomnia. The improvement in insomnia severity reported by participants who received anxiety treatment first was similar in magnitude to the improvement reported by participants who received insomnia treatment first (i.e., a large effect size). The current study adds to the scarce literature on the effect of anxiety treatments on insomnia. A recent meta-analysis showed that only 2% of studies of CBT for anxiety disorders included sleep as an outcome measure and the combined effect size of those studies was moderate (Belleville et al., 2010). Likewise in the reverse case, few other studies have examined the specific effects of anxiety treatment on insomnia. Bélanger, Morin, Langlois, and Ladouceur (2004) and Blais, Mimeault, and Morin (2000) found a significant reduction in insomnia severity after treatment for generalized anxiety disorder. McGowan and Behar (2013) examined the effect of stimulus control to associate worry with a specific time and place. Participants were university students who scored as high trait worriers on a measure of worry. They reported that the stimulus control intervention produced clinically significant changes (over two standard deviations below pre-treatment group mean) in a measure of insomnia severity in 8% of participants.

Overall the results of this study showed that the combined anxiety and insomnia interventions produced effects of at least similar magnitude of those published in the literature (See Chapter Three; Okajima et al., 2011.)

Another contribution to the literature from this research was a specific focus on the order in which treatment components are administered, with a comparison of change scores between conditions both in general—at the end of treatment—and in detail—before and after each treatment half. These analyses showed that initial anxiety or insomnia treatment had comparable effects on insomnia severity but not on anxiety or stress, where the anxiety first intervention was more effective. Jansson-Fröjmark, Lind, and Sunnhed (2012) recently examined the effect of targeting worry in the behavioural treatment of insomnia (stimulus control and sleep restriction). They found that behaviour therapy with controlled worry was superior to behaviour therapy alone, in reducing insomnia severity and worry at two-weeks after the end of treatment. The different trajectories of improvement associated with the two treatment conditions in the current research indicate that targeting anxiety before sleep may enhance efficacy of insomnia treatment. Jansson-Fröjmark, Lind, and Sunnhed (2012) recently examined the effect of targeting worry in the behavioural treatment of insomnia (stimulus control and sleep restriction). They found that behaviour therapy with controlled worry was superior to behaviour therapy alone, in reducing insomnia severity and worry at two-weeks after the end of treatment.

Opportunities for further studies

The current research provides promising results regarding targeting anxiety as well as sleep in the treatment of insomnia. It would be valuable for

future research to examine further the issues investigated in this research, particularly where the specific effects of anxiety interventions on insomnia are concerned. In addition, future studies should continue to investigate how to best integrate anxiety and insomnia treatments. For instance, what are the specific mechanisms and benefits of treating anxiety first and could these be combined with sleep interventions in a mixed approach rather than a sequential approach? It would also be important to know how participants receiving combined anxiety and insomnia treatments fare in the long term (i.e., 12 months plus). In particular, future studies could investigate whether the addition of anxiety treatment to insomnia interventions can prevent insomnia recurrence in the long term.

In using the DASS-21 stress and anxiety subscales, it seemed that study participants differed in their experience of anxiety. More people scored higher in cognitive arousal (stress subscale) than in physiological arousal (anxiety subscale), and others scored high on both. These issues with anxiety and stress might not have been observed with a different psychometric instrument. The DASS-21 is a psychometrically sound instrument but it cannot be ruled out that differences in anxiety and stress were an artefact of the measure utilised. Thus, multiple measures of anxiety and stress would have been beneficial and future studies could investigate whether there are any differences in the nature of the insomnia associated with anxiety and stress.

Despite a significant decrease in time awake during the night, a high proportion number of participants were still awake for longer than 30 minutes during the night. The current study used stimulus control as the main behavioural sleep intervention and response to treatment could have been

influenced by factors such as adherence, type of intervention, or length of implementation. Future studies should not only investigate more closely the different effects of Stimulus Control and Sleep Restriction on insomnia symptoms, but also examine ways to increase adherence to and the effectiveness of these insomnia treatment components.

In terms of mode of treatment delivery, further research could investigate whether in group settings, early improvements from group members can enhance treatment expectancy and engagement with delayed responders. Furthermore, studies could also investigate whether allowing more time for participants to implement the behavioural sleep strategies in between sessions would have been more beneficial. Alternatively, the effects of post-treatment booster sessions could be investigated with participants who still experienced significant problems with insomnia at the end of treatment. Finally, having identified four core elements of insomnia interventions (sleep behaviours and cognitions, cognitive and physiological arousal), future studies could also investigate whether these elements can be delivered following a more individualised treatment plan, allowing a more intense focus on the most problematic areas.

Implications for practice

Thus study demonstrated a cost-effective group therapy intervention for insomnia and anxiety. Insomnia incur high costs to the society and to the individual (Scott et al., 2011) and this research provides evidence of effectiveness of a combined anxiety and insomnia treatment. As scientist-practitioners, clinical psychologists draw on research to deliver the most effective interventions with their clients. Research shows that insomnia

symptoms can be successfully addressed in the context of other conditions and that anxiety is amongst the causal and maintaining factors involved in the aetiology of insomnia. In order to continue to deliver evidence-based treatments, clinical psychologists should not dismiss symptoms of insomnia as 'secondary' and insomnia should also be treated. When the main complaint is of insomnia, then a thorough assessment of anxiety- and sleep-specific factors is warranted so that evidence from the literature is integrated into clinical practice.

Conclusion

This research and the wider body of literature on the psychological aspects of insomnia provide compelling evidence for the need to target cognitive and physiological arousal in general, as well as behaviours and cognitions specifically related to sleep and insomnia(e.g., Carney & Edinger, 2010). The current study sits amongst others in providing evidence for the added benefit of targeting physiological and cognitive arousal as part of the psychological treatment of insomnia. Because methodological differences preclude direct comparison with other published studies, future studies that improve the methodological limitations described above are needed. In future, studies can further help us understand how to best combine these two interventions. More specifically, studies can investigate if the experience of insomnia differs as a result of the different types of anxiety people experience. Another important area of research is the investigation of how to best deliver anxiety and insomnia treatments. Future studies could compare efficacy of treatments that allow for different levels of individualisation of treatment plan, particularly in the context of group treatments.

Chronic sleep problems affect about one-quarter of the population across a variety of countries and untreated insomnia is costly to the individual and to the society. This research showed the efficacy of a treatment programme that aimed to address the full causal and maintaining factors of insomnia and the improvements seen were sustained at the three-month follow-up. Furthermore, a group intervention appeared attractive and beneficial to the participants, and because it is cost-effective, it recommended that treatment providers consider implementing such interventions. In this way both the individual and the society will benefit as we continue to refine the best way to treat insomnia.

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Appendix A

Research participant information

Massey University

Lying awake worrying?

Thousands of people have trouble sleeping to the extent that it impacts on their day-to-day life. Many of these people lie awake worrying.

The Psychology Clinic at Massey University in Wellington is now providing a new group treatment service for people with anxiety-related insomnia. Groups will be of around eight people and will run over 10 weekly two-hour sessions. Standard cost for the entire treatment is $400.

Fernanda Mottin, Doctor of Clinical Psychology candidate is conducting a research project to evaluate the effectiveness of this treatment service. If you would be interested in attending the group and participate in the research, the School of Psychology would subsidise the cost of your treatment by $75, reducing the fee to $325.

If you would like to attend the treatment group, please contact the Psychology Clinic on 801 0492 or ask your GP to make a referral. For information about the research study, contact Fernanda via the Clinic.

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Group Treatment for Anxiety-related Insomnia
Information Sheet

You are invited to take part in a study that will examine effectiveness of Cognitive-Behavioural Group Therapy for anxiety-related insomnia. You do not have to accept to take part in this study. Participation is voluntary and if you decide not to take part, you will not be penalized in anyway. You are welcome to talk to a family member, friend or doctor before deciding to take part in this study or not. You will have the time to ask questions should you have any queries and you can bring a whanau member or other support person along for the first time we meet if you wish to do so.

What does taking part involve?
In order to take part in this research you need to be attending (or planning to attend) the Massey University Psychology Clinic group treatment programme for anxiety-related insomnia. This treatment programme extends over ten weekly group therapy sessions of 2 hours each, with a two-week interval after five weeks. This research programme is examining the outcome of this treatment programme. The total duration of the treatment group is 12 weeks, plus a follow-up assessment to occur three months after the group finishes. Each group will have eight participants in it and you all be required to fill in a Confidentiality Contract to protect your identities. No material which could personally identify you will be used in any reports of this study.

This study is part of a clinical service to be offered by the Massey University Psychology Clinic. The standard charges for attending this service are $375.00 for the ten-week programme. If you are a participant in this research your fees will be subsidised by the University, so that the final cost to you would be $300.00. This subsidy is in partial recognition of your time and effort required to attend an initial screening assessment and to fill in the additional questionnaires required (see below).

What will happen during the study?
In addition to standard assessment interviews, participants will complete measures about their sleep, mood, quality of life and sleep-related beliefs. You might use a device similar to a wristwatch to track your movement during the night. This device is non-invasive and does not cause pain or discomfort. You will also be contacted at a follow-up period of 3 months to gather additional data on your sleep, mood and quality of life. You may also be contacted individually to be interviewed about your personal experience throughout the therapy process—you do not have to accept this invitation and this would not affect your participation in the group therapy.

What sorts of people are being invited to take part on this study?
You are invited to take part on this study because you either answered the advert on the paper or because your GP or a WellSleep clinician thought this therapy might be beneficial for your insomnia.

You are required to be willing to participate in the group therapy at the Psychology Clinic, and to be 18 years of age or older, and be comfortable using the English language, and complain of difficulty initiating or maintaining sleep that lasts over 30minutes, and these difficulties should be present over 3 times per week, and these difficulties should last over 6 months, and you will not be receiving psychological treatment for insomnia or anxiety, and

you will not be experiencing psychotic symptoms or other psychiatric disorder symptoms that might warrant immediate attention. You also believe that you might worry too much and this could be interfering with your sleep.

What other information will be collected during the study?
Some of the sessions might be videotaped and used for research purposes only, in order to ensure treatment is being carried out according to professional guidelines and following the content planned for the session. Its contents will remain confidential and the tapes will be securely erased or destroyed at the end of the study.

What will happen to the information collected during the study?
The information obtained from our initial interview and the questionnaires collected during the study will be stored in the Psychology Clinic secure file storage. These documents will be kept for a period of at least 10 years and then securely destroyed.

Are there any benefits or risks?
The group therapy format used in this study is based on individual therapeutic techniques that have been extensively researched and proved to be effective with no risks involved. Some aspects of it might make you feel more tired initially but this is normal and expected and will improve. As with any psychological treatment, sometimes the symptoms get worse before getting better.

Taking part is voluntary.
Your participation in this study is entirely voluntary and you decided whether to take part or not. You will not be penalized should you decline to participate in this study.

If you do agree to take part you are free to withdraw from the study at any time, without having to give a reason and this will in no way affect you continuing/future health care. In particular, you are free to withdraw from this research study and still continue to receive the group treatment programme for anxiety-related insomnia from the Psychology Clinic, under the standard Psychology Clinic arrangements.

Finding out about the results.
If you would like to find out about the results of this study, please inform so on the appropriate space on the consent form. It will take some time between completion of study and publication of results.

Further information.
If you would like more information about the study do not hesitate in contacting one of us:

- Fernanda Mottin telephone: 801 0492
- Dr. Duncan Babbage telephone: 801 5799 x62039

If you have any questions or concerns about your right as participant in this research study you can contact an independent health and disability advocate. This is a free service provided under the Health and Disability Commissioner Act.
Telephone: 0800 555 050 (NZ wide)
Email: advocacy@hdc.org.nz

This study has received approval from the Central Regional Ethics Committee.

Fernanda Mottin
Doctoral candidate

Duncan Babbage, PhD
Senior Lecturer, Clinic Director

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Group Therapy for Anxiety-related Insomnia
Consent Form

English	I wish to have an interpreter	Yes	No
Maori	E hiahia ana ahau ki tetahi kaiwhakamaori/kaiwhaka	Ae	Kao
Cook Island	Ka inangaro au I teteai tangata uri reo	Ae	Kare
Fijian	Au gadreva me dua e vakadewa vosa vei au	Io	Sega
Niuean	Fia manako au ke fakaaoga e taha tagata fakahokohoko Kupu	E	Nakai
Samoan	Out e mana'o ia I ai se fa'amatala upu	Ioe	Leai
Tokelaun	Koa o e fofou ki he tino ke fakaliliu te gagana Peletania ki na gagana o na motu o te Pahefika	Ioe	Leai
Tongan	Oku ou fiema'u ha fakatonulea	Io	Ikai

I have read and understand the information sheet for participants in the Anxiety–related Insomnia Group Therapy study. I have had the opportunity to discuss this study and ask questions. I am satisfied with the answers I have been given.

I have had the opportunity to use whanau support/friends to help me ask questions and understand the study.

I understand that taking part in this study is voluntary (my choice), that I may withdraw at any time, and that this will in no way affect my continuing/future health care. In particular, I know I am free to withdraw from this research study and still continue to receive the group treatment programme for anxiety-related insomnia from the Psychology Clinic, under the standard Clinic arrangements.

I understand that my participation in this study is confidential and that no material which could identify me will be used in any reports on this study.

I consent to some of the sessions being videotaped to ensure treatment is given according to professional guidelines.

I consent to being contacted three months after the group for a follow-up assessment.

I would like to receive a summary of the results of this study. Yes No

I _____ hereby consent to take part in this study.

Signature: _____

Date: _____

Please feel free to contact one of us if you need more information.

- Fernanda Mottin Telephone: 04 801 0492
- Dr. Duncan Babbage Telephone: 04 801 5799 x62039

This study has received ethics approval from the Central Regional Ethics Committee.

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Group Therapy for Anxiety-related Insomnia
Individual Case Study Information Sheet

You are invited to provide information for an Individual Case Study regarding your experience throughout the Group Therapy for Anxiety-related Insomnia study. You do not have to accept this invitation and this would not affect your participation in the group. You are welcome to talk to a family member or friend before deciding to take part in this interview or not. You will have the time to ask questions should you have any queries and you can bring a whanau member or other support person along for the interview if you wish to do so.

What does taking part involve?
We will be looking in more detail at the data from your assessment throughout the group therapy and we will meet in person to discuss these. This interview should last for about 1hr and it could be done either at the Massey University Psychology Clinic or at your home, at your preference. There are no costs associated with this interview, except for your usual travel expenses if you decide to have the interview at the Psychology Clinic. (These will not be reimbursed.)

What will happen during the interview?
During the interview we will discuss your experiences throughout the group therapy. In particular, we are interested to know what it was like for you to have been a part of the group therapy study and how this process impacted on your life. Some of the questions will be personal in nature (i.e. about your experiences, feelings and relationships) and others will be more general (i.e. about the group therapy itself: how useful or difficult were the content of sessions, specific issues about each treatment, where were the biggest improvements felt, and so on).

What sorts of people are being invited to take part on this study?
People who are completing the group treatment programme for anxiety-related insomnia at the Psychology Clinic.

What other information will be collected during the study?
The interview will be audiotaped to assist with analysis of your responses. The audiotapes will be wiped once this has occurred.

What will happen to the information collected during the study?
All documents will be stored in the Psychology Clinic secure file storage. These documents will be kept for a period of at least 10 years and then securely destroyed.

Are there any benefits or risks?
By taking part in this interview you will allow the researchers to look at the effects of the group therapy from a different perspective. This will provide valuable information that will aid in the implementation of this service at the Psychology Clinic. In addition, by talking about your experiences you will be able to assimilate them further into your life and perhaps talk about specific issues that might have not been raised

otherwise. Your identity will be fully protected during this individual case study by giving you pseudonyms and changing any other information which might clearly identify you.

There are no known direct risks in taking part on this interview. You will, however be disclosing detailed information about recent life events. Thus, someone who knows you well and is already familiar with the information you provide us, and who also reads the published study, could possibly identify you even after all precautions have been taken to keep your identity anonymous.

Taking part is voluntary.
Your participation in this Individual Case Study is entirely voluntary and you decide whether to take part or not. You do not have to accept this invitation and you will not be penalized should you decline to take part in this study.

Finding out about the results.
The results from this Individual Case study will be published with the results from the Group Therapy for Anxiety-related Insomnia study. If you would like to find out about the results of the study please indicate so in the appropriate space on the consent form. It will take some time from the completion of study to the publication of results.

Further information.
If you would like more information about the study do not hesitate in contacting one of us:

- Fernanda Mottin telephone: 801 0492
- Dr. Duncan Babbage telephone: 801 5799 x62039

If you have any questions or concerns about your right as participant in this research study you can contact an independent health and disability advocate. This is a free service provided under the Health and Disability Commissioner Act.
Telephone: 0800 555 050 (NZ wide)
Email: advocacy@hdc.org.nz

This study has received approval from the Central Regional Ethics Committee.

Fernanda Mottin
Doctoral candidate

Duncan Babbage, PhD
Senior Lecturer, Clinic Director

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Group Therapy for Anxiety-related Insomnia
Individual Case Study Consent Form

English	I wish to have an interpreter	Yes	No
Maori	E hiahia ana ahau ki tetahi kaiwhakamaori/kaiwhaka	Ae	Kao
Cook Island	Ka inangaro au I teteai tangata uri reo	Ae	Kare
Fijian	Au gadreva me dua e vakadewa vosa vei au	Io	Sega
Niuean	Fia manako au ke fakaaoga e taha tagata fakahokohoko Kupu	E	Nakai
Samoan	Out e mana'o ia I ai se fa'amatala upu	Ioe	Leai
Tokelaun	Koa o e fofou ki he tino ke fakaliliu te gagana Peletania ki na gagana o na motu o te Pahefika	Ioe	Leai
Tongan	Oku ou fiema'u ha fakatonulea	Io	Ikai

I have read and understand the information sheet for Case Study participants in the Group Therapy for Anxiety-related Insomnia study. I have had the opportunity to discuss this study and ask questions. I am satisfied with the answers I have been given.

I understand that taking part in this interview is voluntary (my choice) and that I may withdraw from it at any time and this will in no way affect my continuing/future health care.

I understand that my participation in this study is confidential and that no material which could identify me will be used in any reports on this study.

I consent to being interviewed about my experiences throughout the group therapy process.

I would like to receive a summary of the results of this study. Yes No

I _____ hereby consent to take part in this study.

Date:

Signature:

Please fell free to contact one of us if you need more information.

- Fernanda Mottin Telephone: 04 801 0492
- Dr. Duncan Babbage Telephone: 04 801 5799 x62039

This study has received ethics approval from the Central Regional Ethics Committee.

Appendix B

Treatment manual

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Group Therapy for Anxiety-related Insomnia
Insomnia-First Group—Mondays

Sesssion One

Aims

- Introduce therapists and members.
- Ground rules & sign confidentiality agreement.
- Outline programme and CBT Insomnia model.
- Sleep information—each individual has own sleep/wake rhythm.
- "Better Sleep Guidelines"—eliminating behaviours that interfere with sleep.

Psychometrics (on arrival) — 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)

Review — Duncan—30 minutes

Brief explanation of the group purpose:

- everyone with difficulty with sleep, some degree of anxiety.
- tools to help improve sleep, manage worries and anxiety.
- eight 2-hour sessions, including a break.
- importance of the other 166 hours—*they* make the changes during their week, using tools from here.
- structure of the group each week (quick update scales on arrival, review of tasks, new theory, activity).

Ground rules (begin with brainstorm with the group). If they don't come up, also include:

- confidentiality and confidentiality agreement.
- attending every session.
- being on time.
- if must miss a session, inform the psychology clinic.

Warm up exercise (tba) ..... Fernanda

Theory — Duncan—30 minutes

Outline programme structure and objectives.
Overview of the programmes' eight sessions.
Discussion of elements to be covered during either insomnia or anxiety part.
In this group, **insomnia** will be covered first.

CBGT as an empirically validated therapy

- interventions known to be effective.
- people will respond differently, some improving faster than others; this is normal and expected.
- it is what *they* do in the other 166 hours that will make the difference.

What is the five-part model? Model that will guide the treatment—the five-part model:

- **Emotion**—anxiety
- **Physiological**—arousal/hypervigilance
- **Behaviours**—alcohol at night/watch TV in room
- **Thoughts**—sleep/consequence related- "Oh no, it's 3 am"—"I will never go back to sleep"—"My day at work tomorrow will be awful"—"There must be something wrong for me to wake up at this time"—"Have I finished preparing…?"
- **Environment**—bedroom/relationships/sleeping arrangements.

What is sleep?—objective information:

- Sleep patterns.
- Circadian rhythms.

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- Sleep stages and phases.
- Purposes of sleep.
- Discuss prevalence and normalization of sleep problems.
- Introduce the cognitive–behavioural model of insomnia.
- Revisit the relationship between anxiety and insomnia.
- Briefly provide an overview of the treatment strategies that will be used in the coming sessions.

10 minute break

Application Fernanda—30 minutes

Review participants' sleep diaries.

- Plot diary data on a graph (whiteboard) to demonstrate patterns experienced by participants.
- Discuss effects of sleep problems on participants' lives.

Introduce *Better Sleep Guidelines* (sleep hygiene)

- link suggestions to sleep information and model previously discussed (provide a rationale).

Review questions, introduce homework, explain process with psychometrics on arrival, wrap-up.
Handouts: Session summary and *Better Sleep Guidelines.*

Homework 10 minutes

Implement *Better Sleep Guidelines* during coming week.

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Group Therapy for Anxiety-related Insomnia
Insomnia-First Group—Mondays

Session Two

Aims

- Introduce five-part model in insomnia context, with a particular focus on behavioural interventions.
- Stimulus Control to re-associate sleep and bedroom with sleep.

Psychometrics (on arrival) — 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)

Review — Duncan—30 minutes

Use of the *Better Sleep Guidelines.*

- what was helpful.
- what was difficult.
- what got in the way.
- discuss possible solutions.

Theory — Fernanda—30 minutes

Behavioural interventions and sleep.
Relationship between behaviours/thoughts/feeling/body.
Overview of how we will approach this:

- beginning with simple behavioural interventions, fast with immediate results.
- later we will also move on to looking at thoughts.

Using the five-part model as a guide, imagine a situation:

- discuss how to separate the different aspects of thoughts, feelings, behaviour and physiological mechanisms.
- focus in particular on the role of behavioural change in changing other parts of this model and in particular changing outcomes.

If there is time as part of this discussion, participants should begin to draft a five-part model for their own situation either alone, in pairs or as a group.

10 minute break

Application — Duncan—30 minutes

Introduce *Stimulus Control*.

- Insomnia is influenced by many factors, including poor sleeping habits and environment.
- Using the bedroom for non-sleep interferes with sleep (reading, watching TV, working/studying and even worrying).
- These activities are incompatible with falling asleep –> bed and bedroom associated with wakefulness and lead to irregular sleep-wake patterns.
- Re-associate bed/bedroom with sleep and create/re-establish a regular sleep-wake pattern:
  1. Go to bedroom and lie down only when you are tired and sleepy.
  2. Do not use your bed/bedroom for anything but sleep. Do not read, watch TV, eat, talk on phone or worry in bed. Sex is ok; however, if you do not feel sleepy afterwards then follow these instruction and return to bed/bedroom later.
  3. If you find yourself unable to fall asleep, get up and go to another room. Do not stay in bed and try to sleep. Do not watch the clock but if you don't fall asleep within about 10 minutes, get out of bed. Remember that the goal is to associate bed with falling asleep quickly and not worrying about how long it takes for you to sleep.

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4. After a 20 minute break in another room go back to bed and repeat step 3. Do this as often as needed during the night. Remember the "Better Sleep Guidelines" and do not engage in stimulating activities; herbal teas or warm milk can be taken but not in excess to avoid trips to the toilet
5. Set you alarm at a reasonable time and get up at that same time everyday, regardless of the time you actually fell asleep.
6. Do not nap during the day as this will affect how sleepy you feel at night.

Provide rationale for the use of Stimulus Control, tying this to insomnia model.
Discuss efficacy of this intervention.
Group discussion to address queries, anticipate obstacles or barriers and find some possible solutions.

Questions, wrap-up.
Handouts: Session summary and *Stimulus Control instructions.*

Homework 10 minutes

Implement *Stimulus Control* procedures.
Continue with *Better Sleep Guidelines*.

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Group Therapy for Anxiety-related Insomnia
Insomnia-First Group—Mondays

Session Three

Aims:

- Ensure participants' understanding of the relationship between thoughts and emotions as understood from a cognitive framework, and the mechanisms through which they filter our perception.
- Identify any unhelpful beliefs about sleep participants hold.
- Introduce participants to the concept of "faulty cognitions".
- Challenge those beliefs in session and provide tools so participants can challenge them at home also.

Psychometrics (on arrival) — 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)
- Dysfunctional Beliefs and Attitudes about Sleep-16 (16 items)

Review — Fernanda—30 minutes

Review implementation of *Stimulus Control* recommendations.

- Discuss obstacles or difficulties faced.
- Clarify rationale and empirical support of therapy (incl. sleep gets worse before getting better).

Review ongoing use of *Better Sleep Guidelines*.

Theory — Duncan—30 minutes

Introduce concept of cognitions and faulty cognitions in the five-part model.

- Introduce automatic thoughts.
- Discuss influence on behaviours and emotions.
- Outline most common types of cognitive distortions: catastrophising, overgeneralisation, dichotomous thinking, personalising, negative focus, jumping to conclusions, fixed rules.
- Introduce concept of challenging negative automatic thinking.

Discuss the five common misconceptions about sleep (Morin, 1993)

- causes.
- consequences.
- unrealistic expectations.
- control and predictability of sleep.
- sleep-promoting practices.

10 minute break

Application — Duncan—30 minutes

Review participants' DBAS-16 answers together.

- Identify most disruptive beliefs and misconceptions about sleep.
- Examine behaviours that serve to confirm those distorted beliefs.

Discuss strategies (in session)/experiments (homework) designed to begin changing these.

- Obtaining accurate information about sleep.
- Identifying negative automatic thoughts.
- Challenging negative thoughts and developing and rehearsing alternative beliefs.

Questions and wrap-up.
Handouts: Session summary and *Experiment Sheet*.

Homework — 10 minutes

Cognitive intervention experiments.

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Continue with *Better Sleep Guidelines* and *Stimulus Control*.

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Group Therapy for Anxiety-related Insomnia
Insomnia-First Group—Mondays

Session Four

Aims:

- Continue cognitive restructuring work and identify overlooked areas
- Consolidate learning and changes
- Create contingency plan for the break

Psychometrics (on arrival) — 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)
- Dysfunctional Beliefs and Attitudes about Sleep-16 (16 items)

Review — Fernanda—30 minutes

Review cognitive intervention homework experiment.

- discuss obstacles or difficulties faced.
- provide assistance with overcoming obstacles through reinforcement of theory behind this or brainstorming more balanced alternative beliefs (depending on issues participants experienced).

Review ongoing *Better Sleep Guidelines* and *Stimulus Control* work.

- Identify areas overlooked in previous sessions and address these if possible.
- Discussion on impact of changes in participants' routines.

Theory — Duncan—30 minutes

Why do cognitive interventions fail?

- good aim—targeting the correct thoughts.
- firing shells with explosives—believability of balanced beliefs vs. unrealistically positive beliefs.
- progressive change vs. overnight success.
- evaluating your beliefs about your success or "failure".

Discussion of group members' experiences of these issues over the course of the last two weeks.

10 minute break

Application — Fernanda—30 minutes

Extended question and answer time, including contingency planning for the break.

- What has been learnt in the past four weeks?
- What has changed for group members?
- Discuss how group members will overcome previous difficulties and possible obstacles during break.
- Emphasise importance of continuing interventions as part of a new routine rather than just homework.

Wrap-up.
Handouts: Session summary and *Achievement Sheet*.

Homework — 10 minutes

Sleep Diaries.
Continuing *Better Sleep Guidelines*, *Stimulus Control* and challenging unhelpful beliefs.

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Group Therapy for Anxiety-related Insomnia
Insomnia-First Group—Mondays

Sesssion Five

Aims

- Remind participants of ground rules and confidentiality agreement.
- Review what has been learned and achieved during the break and last four sessions.
- Re-introduction of CBT-insomnia model and programme outline.
- Presentation of anxiety model.
- Practice five-part model.
- Relaxation exercise.

Psychometrics (on arrival) 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)

Review Duncan—30 minutes

Review group member's continuation of insomnia interventions over the break.

- Discuss obstacles or difficulties faced with behavioural interventions.
- Discuss obstacles or difficulties faced with cognitive interventions.
- Examine new routines developed; changes in relationships; new behaviours learned.
- What has been learned about their insomnia and anxiety?
- What has been helpful? what got in the way?

Warm up exercise (tba) ..... Fernanda

Theory Fernanda—30 minutes

Re-state that in the second half of the programme, **anxiety** will be the primary focus (but they should personally keep working on the insomnia interventions they have already begun).

Briefly review the five-part-insomnia model guiding the programme.

What is anxiety?—objective information:

- Discuss prevalence and normalization.
- Introduce the cognitive–behavioural model of anxiety.
- Explain triggers and maintaining factors (safety behaviour and avoidance).
- Discuss how anxiety leads to insomnia.
- Briefly provide an overview of the treatment strategies that will be used in the coming sessions.

10 minute break

Application Duncan—30 minutes

Relaxation

The therapist introduces relaxation techniques, explains the rational and the benefits of using relaxation. In introducing this part of the treatment the following points should be covered:

- Tension plays an important role in the anxiety cycle as it represents a state of readiness to cope with stress. Therefore tension is an important target of intervention.
- Relaxation is presented as a skill that requires practice (this is highlighted in order to avoid clients viewing this exercise as magical cure.)
- Relaxation is intended to improve the ability to detect initial signs of tension and to reduce the intensity of arousal and tension, which indirectly reduces the worry. The therapist explains here that this will be achieved in later stages when clients learn to apply both relaxation and cognitive coping skills.
- Rules of relaxation (practicing relaxation without added pressure of "I have to relax or else..?", initially using relaxation in quiet places without any distraction).

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Then the therapist teaches the group abdominal breathing and progressive muscle relaxation and also leads the group through a detailed visualization of a safe peaceful place.

Handouts: Session summary, *Relaxation guidelines,* and relaxation CDs.

Homework 10 minutes

Relaxation everyday for 30 minutes before bedtime.

Identify situations and/or thoughts that cause anxiety or that are avoided (a rational for doing this is provided, e.g., exposure next week. Clients are instructed in how to use this form.

CBT model of anxiety, *Guidelines for relaxation, Relation recording form* handouts.
Relaxation exercise CDs for participants.

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Group Therapy for Anxiety-related Insomnia
Insomnia-First Group—Mondays

Session Six

Aims

- Re-introduce five-part model in anxiety context.
- Introduction to behavioural treatments (exposure).
- Generation of exposure hierarchy using items from homework as well as objects or situations mentioned during the group work.

Psychometrics (on arrival) — 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)

Review — Fernanda—30 minutes

Use of homework: relaxation exercise and identification of feared situations.

- What was helpful?
- What was difficult?
- What got in the way?
- Discuss possible solutions.

Theory — Duncan—30 minutes

Behavioural interventions and anxiety.

- Review of behavioural model of anxiety and thus behavioural interventions for anxiety.
- Discuss role of safety behaviours and avoidance in maintaining anxiety.
- Define exposure and present rational for exposure.
- Introduce types of exposure.
- Guidance regarding planning exposure (*Exposure guidelines* handout).
- Example of an exposure hierarchy.

10 minute break

Application — Fernanda—30 minutes

Introduce "Exposure Hierarchy"

- At this stage, the therapist redirects participant's attention to their previous week's homework and to the feared stimuli that they have identified in order to initiate the planning of exposure.
- Since not everyone will have the same fears, a graded hierarchy of situations that are problematic now and in the future will be developed for each participant.
- If there is sufficient time an in-session exposure (Imaginable exposure only) can be carried out. Thus, the participants are asked to imagine a situation that is taken from their list that they fear or avoid (the lowest risk situation of the hierarchy). As they imagine this situation, they are asked to write down the negative thoughts they had before, during, and after the situation, the emotions they had before, during and after the situation and the behaviour reactions and bodily sensations, and environment, so as to keep it consistent with the five-part model - the pedagogical principle being building on earlier learning in Session 1.
- Discuss efficacy of this intervention.
- Group discussion to address queries, anticipate obstacles or barriers and find some possible solutions.

Questions, wrap-up.
Handouts: Session summary and *Exposure guidance.*

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Homework 10 minutes

- Continue Relaxation for 30 minutes each day.
- Conduct exposure practices 1 hour daily (here the therapist acknowledges that it is difficult to do this exercise but this is a type of exercise, which as often you do as easier it gets. Also possible failure to do exposure is normalized.
- Try to notice thoughts that are happening as you are practicing as this will help understand next week's session.

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Group Therapy for Anxiety-related Insomnia
Insomnia-First Group—Mondays

Session Seven

Aims

- Introduce cognitive treatment of anxiety.
- Ensure participants' understanding of the role of thoughts in CBT and the mechanisms through which they bias our perception.
- Identify participants' anxiety provoking thoughts.
- Introduce participants to the concept of "faulty cognitions".
- Description of the most common types of cognitive distortion associated with anxiety is presented: *probability overestimation* (i.e., overestimating the likelihood of an event), and *catastrophising* (exaggeration of the negative consequences of an event) and *underestimating the ability to cope*.
- Challenge those beliefs in session and provide tools so participants can challenge them at home also.

Psychometrics (on arrival) — 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)
- Dysfunctional Beliefs and Attitudes about Sleep-16 (16 items)

Review — Fernanda—30 minutes

Review implementation of exposure and relaxation training.

- Discuss obstacles or difficulties faced.
- Clarify rationale and empirical support of therapy.
- Encourage and support.
- Difficulties are addressed and the appropriate exposure habits are reinforced.

Theory — Duncan—30 minutes

Discuss role of cognitions and five-part model in development and maintenance of anxiety:

- Most common cognitive distortions associated with anxiety:
  probability overestimation (i.e., overestimating the likelihood of an event), and
  catastrophising (exaggeration of the negative consequences of an event) and
  underestimating the ability to cope.
- At times of high anxiety, anxious people are more likely to experience threatening images and predictions and to treat these thoughts as if they were fact.
- Importance of treating thoughts as hypotheses that may or may not be accurate and as just one of the possible interpretations.

In order to sort out the probable hypothesis from improbable, it is important to evaluate:

- What's the evidence for and against?
- Is there an alternative explanation?

Discuss reasons why distortions persist despite recurring disconfirmation. Main contributors:

- Safety behaviours.
- Avoidance.

10 minute break

Application — Fernanda—30 minutes

Group exercise

Working once more with automatic thought recording forms, elicit a recent anxiety-provoking situation from a group member. As a group, work through the record form identifying what may have been happening and applying the cognitive principles learned in the first half of the group to this new area.

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Discuss the risks of retrospectively recording what you believe you were thinking vs. the benefits of completing the record forms as close to the time as possible.

If there is time, group members can then work through the same situation individually or in pairs with one of their own situations they have recently experienced where they experienced anxiety.

Questions and wrap-up.
Handouts: *The ABC of Thinking Straight*, guidance for using thought records, experiment worksheet.

Homework 10 minutes

Cognitive intervention experiments.
Continue with relaxation and exposure homework.

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Group Therapy for Anxiety-related Insomnia
Insomnia-First Group—Mondays

Session Eight

Aims

- Finalize cognitive restructuring and identify overlooked areas.
- Consolidate learning.
- Create relapse prevention plan.
- Obtain feedback.

Psychometrics (on arrival) — 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)
- Dysfunctional Beliefs and Attitudes about Sleep-16 (16 items)

Review — Duncan—30 minutes

Review cognitive intervention homework experiment.

- Discuss obstacles or difficulties faced.
- Provide assistance with overcoming obstacles through reinforcement of theory behind this or brainstorming more balanced alternative beliefs (depending on issues participants experienced).

Review ongoing exposure and relaxation work.

- Identify areas overlooked in previous sessions and address these if possible.
- Discussion on impact of changes in participants' routines.

Theory — Fernanda—30 minutes

Maintenance plan for relapse prevention.

- Group members are asked to share the progress they have made, what have they learned and what important experiences they will take with them. This will be based on the following questions:
  1. Think back to when you first started treatment. What gains or accomplishments have you made over the past 10 weeks? What goals have you achieved? What obstacles have you overcome?
  2. What do you need to keep working on after the group ends? What are the situations or experiences that you would like to tackle?
  3. What key information or phrases did you learn in the group that you need to take with you to keep you going?

10 minute break

Application — Duncan—30 minutes

Making a development and maintenance plan.

Participants are handed a piece of paper where they can write about the maintenance plan.

- Make a graded hierarchy of situations that may be problematic now and in the future.
- Plan regular exercises in relaxation, exposure, giving up avoidance and safety behaviour, behavioural experiments and cognitive restructuring work.
- Identify anything we have not covered here that you would like help with.

- Plan systematic work to continue what you have started in this program.
- Make a list of possible setbacks and make a plan to deal with them.
- List new problematic situations that could occur in the future and make a plan to deal with them.

Wrap-up.
Handouts: Session summary and individual relapse plan.

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Homework 2 minutes

Continue the good work...

- Self-monitoring,
- Behavioural experiments
- Cognitive restructuring.
- Exposure and relaxation

Feedback 10 minutes

All participants fill in the feedback form.

Research participants only:
Quality of Life of Insomniacs questionnaire filled in immediately, before departing.
Sleep Diaries given with reply-paid envelope to post them back after completed in two weeks.

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Group Therapy for Anxiety-related Insomnia
Anxiety-First Group—Wednesdays

Sesssion One

Aims

- Introduce therapists and members.
- Ground rules & sign confidentiality agreement.
- Outline programme and CBT model of anxiety-related insomnia.
- Presentation of anxiety model.
- Practice 5 part model.
- Relaxation exercise.

Psychometrics (on arrival) — 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)

Review — Duncan—30 minutes

Brief explanation of the group purpose:

- Everyone with difficulty with sleep experiences some degree of anxiety.
- Tools to reduce worries and anxiety, to help improve sleep
- Eight 2-hour sessions, including a break.
- Importance of the other 166 hours—*they* make the changes during their week, using tools from here.
- Structure of the group each week (quick update scales on arrival, review of tasks, new theory, activity).
- Reminder to have realistic expectations
- Reminder that it is possible that treatment initially causes increased discomfort

Ground rules (begin with brainstorm with the group). If they don't come up, also include:

- Confidentiality and confidentiality agreement.
- Attending every session.
- Being on time.
- If must miss a session, inform the psychology clinic.

Warm up exercise (5 minutes relaxation and mindfulness exercise). ..... Fernanda

Theory — Duncan—30 minutes

Outline programme structure and objectives.
Overview of the programmes' eight sessions.
Discussion of elements to be covered during either insomnia or anxiety part.
In this group, **anxiety** will be covered first.

CBGT as an empirically validated therapy

- interventions known to be effective.
- people will respond differently, some improving faster than others; this is normal and expected.
- it is what *they* do in the other 166 hours that will make the difference.

What is the five-part model? Model that will guide the treatment—the five-part model:

- **Emotion**—anxiety
- **Physiological**—arousal/hypervigilance
- **Behaviours**—alcohol at night/watch TV in room
- **Thoughts**—sleep/consequence related- "Oh no, it's 3 am"—"I will never go back to sleep"—"My day at work tomorrow will be awful"—"There must be something wrong for me to wake up at this time"—"Have I finished preparing…?"
- **Environment**—bedroom/relationships/sleeping arrangements.

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What is anxiety?—objective information:

- Discuss prevalence and normalization.
- Introduce the cognitive–behavioural model of anxiety.
- Explain triggers and maintaining factors (safety behaviour and avoidance).
- Discuss how anxiety leads to insomnia.
- Briefly provide an overview of the treatment strategies that will be used in the coming sessions.

10 minute break

Application Fernanda—30 minutes

Relaxation

The therapist introduces relaxation techniques, explains the rational and the benefits of using relaxation. In introducing this part of the treatment the following points should be covered:

- Tension plays an important role in the anxiety cycle as it represents a state of readiness to cope with stress. Therefore tension is an important target of intervention.
- Relaxation is presented as a skill that requires practice (this is highlighted in order to avoid clients viewing this exercise as magical cure.)
- Relaxation is intended to improve the ability to detect initial signs of tension and to reduce the intensity of arousal and tension, which indirectly reduces the worry. The therapist explains here that this will be achieved in later stages when clients learn to apply both relaxation and cognitive coping skills.
- Rules of relaxation (practicing relaxation without added pressure of "I have to relax or else..?", initially using relaxation in quiet places without any distraction).

Then the therapist teaches the group abdominal breathing and progressive muscle relaxation and also leads the group through a detailed visualization of a safe peaceful place.

Handouts: Session summary, *Relaxation guidelines,* and relaxation CDs.

Homework 10 minutes

Relaxation everyday for 30 minutes before bedtime.

Identify situations and/or thoughts that cause anxiety or that are avoided (a rational for doing this is provided, e.g., exposure next week. Clients are instructed in how to use this form.

CBT model of anxiety, *Guidelines for relaxation, Relation recording form* handouts.
Relaxation exercise CDs for participants.

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Group Therapy for Anxiety-related Insomnia
Anxiety-First Group—Wednesdays

Session Two

Aims

- Introduce five-part model of anxiety
- Introduction to behavioural treatments(exposure)
- Generation of exposure hierarchy using items from homework as well as objects or situations mentioned during the group work. (30 minutes)

Psychometrics (on arrival) 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)

Review Fernanda—30 minutes

Use of homework: relaxation exercise and identification of feared situations

- What was helpful?
- What was difficult?
- What got in the way?
- Discuss possible solutions

Theory Duncan—30 minutes

Behavioural interventions and anxiety.

- Review of behavioural model of anxiety and thus behavioural interventions for anxiety.
- Discuss role of safety behaviours and avoidance in maintaining anxiety.
- Define exposure and present rational for exposure.
- Introduce types of exposure.
- Guidance regarding planning exposure (*Exposure guidelines* handout).
- Example of an exposure hierarchy.

Using the five-part model as a guide, imagine a situation:

- discuss how to separate the different aspects of thoughts, feelings, behaviour and physiological mechanisms.
- focus in particular on the role of behavioural change in changing other parts of this model and in particular changing outcomes.

If there is time as part of this discussion, participants should begin to draft a five-part model for their own situation either alone, in pairs or as a group.

10 minute break

Application Fernanda—30 minutes

Introduce "Exposure Hierarchy"

- At this stage, the therapist redirects participant's attention to their previous week's homework and to the feared stimuli that they have identified in order to initiate the planning of exposure.
- Since not everyone will have the same fears, a graded hierarchy of situations that are problematic now and in the future will be developed for each participant.
- If there is sufficient time an in-session exposure (Imaginable exposure only) can be carried out. Thus, the participants are asked to imagine a situation that is taken from their list that they fear or avoid (the lowest risk situation of the hierarchy). As they imagine this situation, they are asked to write down the negative thoughts they had before, during, and after the situation, the emotions they had before,

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during and after the situation and the behaviour reactions and bodily sensations, and environment, so as to keep it consistent with the five-part model - the pedagogical principle being building on earlier learning in Session 1.

- Discuss efficacy of this intervention.
- Group discussion to address queries, anticipate obstacles or barriers and find some possible solutions.

Questions, wrap-up.

Homework 10 minutes

- Continue Relaxation for 30 minutes each day.
- Conduct exposure practices 1 hour daily (here the therapist acknowledges that it is difficult to do this exercise but this is a type of exercise which as often you do as easier it gets. Also possible failure to do exposure is normalized.
- Try to notice thoughts that are happening as you are practicing as this will help understand next week's session

Handouts: Session summary and *Exposure Guidance.*

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Group Therapy for Anxiety-related Insomnia
Anxiety-First Group—Wednesdays

Session Three

Aims

- Introduce cognitive treatment of anxiety
- Ensure participants' understanding of the role of thoughts in CBT and the mechanisms through which they bias our perception
- Identify participants' anxiety provoking thoughts
- Introduce participants to the concept of "faulty cognitions"
- Description of the most common types of cognitive distortion associated with anxiety is presented: *probability overestimation* (i.e., overestimating the likelihood of an event), and *catastrophising* (exaggeration of the negative consequences of an event) and *underestimating the ability* to *cope*.
- Challenge those beliefs in session and provide tools so participants can challenge them at home also.

Psychometrics (on arrival) — 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)
- Dysfunctional Beliefs and Attitudes about Sleep-16 (16 items)

Review — Fernanda—30 minutes

Review implementation of exposure and relaxation training.

- Discuss obstacles or difficulties faced.
- Clarify rationale and empirical support of therapy.
- Encourage and support.
- Difficulties are addressed and the appropriate exposure habits are reinforced.

Theory — Duncan—30 minutes

Introduce concept of cognitions and faulty cognitions in the five-part model.

- Introduce automatic thoughts.
- Discuss influence on behaviours and emotions.
- Outline most common types of cognitive distortions: catastrophising, overgeneralisation, dichotomous thinking, personalising, negative focus, jumping to conclusions, fixed rules.
- Introduce concept of challenging negative automatic thinking.

Discuss role of cognitions and five-part model in development and maintenance of anxiety:

- Most common cognitive distortions associated with anxiety: probability overestimation (i.e., overestimating the likelihood of an event), and catastrophising (exaggeration of the negative consequences of an event) and underestimating the ability to cope.
- At times of high anxiety, anxious people are more likely to experience threatening images and predictions and to treat these thoughts as if they were fact.
- Importance of treating thoughts as hypotheses that may or may not be accurate and as just one of the possible interpretations.

In order to sort out the probable hypothesis from improbable, it is important to evaluate:

- What's the evidence for and against?
- Is there an alternative explanation?

Discuss reasons why distortions persist despite recurring disconfirmation. Main contributors:

- Safety behaviours.
- Avoidance.

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10 minute break

Application Duncan—30 minutes

Group exercise

Working once more with automatic thought recording forms, elicit a recent anxiety-provoking situation from a group member. As a group, work through the initial sections of the record form identifying what may have been happening. Discuss the risks of retrospectively recording what you believe you were thinking vs. the benefits of completing the record forms as close to the time as possible.

Discuss strategies (in session)/experiments (homework) designed to begin changing negative automatic thoughts.

- Identifying negative automatic thoughts.
- Obtaining accurate information regarding thoughts.
- Challenging negative thoughts and developing and rehearsing alternative beliefs.

If there is time, group members can then work through the same situation individually or in pairs with one of their own situations they have recently experienced where they experienced anxiety.

Questions and wrap-up.

Handouts: *The ABC of Thinking Straight*, guidance for using thought records, experiment worksheet.

Homework 10 minutes

Cognitive intervention experiments.

Continue with relaxation and exposure homework.

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Group Therapy for Anxiety-related Insomnia
Anxiety-First Group—Wednesdays

Session Four

Aims:

- Continue cognitive restructuring work and identify overlooked areas.
- Consolidate learning and changes.
- Create contingency plan for the break.

Psychometrics (on arrival) — 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)
- Dysfunctional Beliefs and Attitudes about Sleep-16 (16 items)

Review — Fernanda—30 minutes

Review cognitive intervention homework experiment.

- discuss obstacles or difficulties faced.
- provide assistance with overcoming obstacles through reinforcement of theory behind this or brain-storming more balanced alternative beliefs (depending on issues participants experienced).

Review ongoing *Relaxation practice and exposure* work.

- Identify areas overlooked in previous sessions and address these if possible.
- Discussion on impact of changes in participants' routines.

Theory — Duncan—30 minutes

Why do cognitive interventions fail?

- good aim—targeting the correct thoughts.
- firing shells with explosives—believability of balanced beliefs vs. unrealistically positive beliefs.
- progressive change vs. overnight success.
- evaluating your beliefs about your success or "failure".

Discussion of group members' experiences of these issues over the course of the last two weeks.

10 minute break

Application — Fernanda—30 minutes

Extended question and answer time, including contingency planning for the break.

- What has been learnt in the past four weeks?
- What has changed for group members?
- Discuss how group members will overcome previous difficulties and possible obstacles during break.
- Emphasise importance of continuing interventions as part of a new routine rather than just homework.

Wrap-up.
Handouts: Session summary and *Achievement Sheet.*

Homework — 10 minutes

Sleep Diaries.
Continuing *Better Sleep Guidelines*, *exposure* and challenging unhelpful beliefs.

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Group Therapy for Anxiety-related Insomnia
Anxiety-First Group—Wednesdays

Sesssion Five

Aims

- Remind participants of ground rules and confidentialit agreement.
- Review what has been learned and achieved during the break and last four sessions.
- Re-introduction of CBT-insomnia model and programme outline.
- Sleep information—each individual has own sleep/wake rhythm.
- "Better Sleep Guidelines"—eliminating behaviours that interfere with sleep.

Psychometrics (on arrival) 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)

Review Duncan—30 minutes

Review group member's continuation of anxiety interventions over the break.

- Discuss obstacles or difficulties faced with behavioural interventions.
- Discuss obstacles or difficulties faced with cognitive interventions.
- Examine new routines developed; changes in relationships; new behaviours learned.
- What has been learned about their anxiety and insomnia?
- What has been helpful? what got in the way?

Warm up exercise (tba) ..... Fernanda

Theory Fernanda—30 minutes

Re-state that in the second half of the programme, **insomnia** will be the primary focus (but they should personally keep working on the insomnia interventions they have already begun).

Briefly review the five-part-insomnia model guiding the programme.

What is sleep?—objective information:

- Sleep patterns.
- Circadian rhythms.
- Sleep stages and phases.
- Purposes of sleep.
- Discuss prevalence and normalization of sleep problems.
- Introduce the cognitive–behavioural model of insomnia.
- Revisit the relationship between anxiety and insomnia.
- Briefly provide an overview of the treatment strategies that will be used in the coming sessions.

10 minute break

Application Fernanda—30 minutes

Review participants' sleep diaries.

- Plot diary data on a graph (whiteboard) to demonstrate patterns experienced by participants.
- Discuss effects of sleep problems on participants' lives.

Introduce *Better Sleep Guidelines* (sleep hygiene)

- link suggestions to sleep information and model previously discussed (provide a rationale).

Review questions, introduce homework, explain process with psychometrics on arrival, wrap-up.
Handouts: Session summary and *Better Sleep Guidelines.*

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Homework 10 minutes

Continue with previous strategies and implement *Better Sleep Guidelines* during coming week.

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Group Therapy for Anxiety-related Insomnia
Anxiety-First Group—Wednesdays

Session Six

Aims

- Re-introduce five-part model in insomnia context
- Stimulus Control to re-associate sleep and bedroom with sleep

Psychometrics (on arrival) — 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)

Review — Duncan—30 minutes

Use of the *Better Sleep Guidelines*

- what was helpful.
- what was difficult.
- what got in the way.
- discuss possible solutions.

Use of previous strategies for anxiety.

Theory — Fernanda—30 minutes

Behavioural interventions and sleep.

- Review of behavioural model of insomnia and thus behavioural interventions for insomnia.
- Discuss role of unhelpful behaviours in maintaining insomnia.

Using the five-part model as a guide, discuss an example of an insomnia situation:

- Discuss how to separate the different aspects of thoughts, feelings, behaviour and physiological mechanisms in an insomnia context, drawing on experience with anxiety work.
- Focus in particular on the role of behavioural change in changing other parts of this model and in particular changing outcomes.

If there is time as part of this discussion, participants should begin to draft a five-part model for their own situation focussed specifically on insomnia, either alone, in pairs or as a group.

10 minute break

Application — Duncan—30 minutes

Introduce *Stimulus Control*.

- Insomnia is influenced by many factors, including poor sleeping habits and environment.
- Using the bedroom for non-sleep interferes with sleep (reading, watching TV, working/studying and even worrying).
- These activities are incompatible with falling asleep –> bed and bedroom associated with wakefulness and lead to irregular sleep-wake patterns.
- Re-associate bed/bedroom with sleep and create/re-establish a regular sleep-wake pattern:
  1. Go to bedroom and lie down only when you are tired and sleepy.
  2. Do not use your bed/bedroom for anything but sleep. Do not read, watch TV, eat, talk on phone or worry in bed. Sex is ok; however, if you do not feel sleepy afterwards then follow these instruction and return to bed/bedroom later.
  3. If you find yourself unable to fall asleep, get up and go to another room. Do not stay in bed and try to sleep. Do not watch the clock but if you don't fall asleep within about 10 minutes, get out of bed. Remember that the goal is to associate bed with falling asleep quickly and not worrying about how long it takes for you to sleep.

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4. After a 20 minute break in another room go back to bed and repeat step 3. Do this as often as needed during the night. Remember the "Better Sleep Guidelines" and do not engage in stimulating activities; herbal teas or warm milk can be taken but not in excess to avoid trips to the toilet
5. Set you alarm at a reasonable time and get up at that same time everyday, regardless of the time you actually fell asleep.
6. Do not nap during the day as this will affect how sleepy you feel at night.

Provide rationale for the use of Stimulus Control, tying this to insomnia model.
Discuss efficacy of this intervention.
Group discussion to address queries, anticipate obstacles or barriers and find some possible solutions.

Questions, wrap-up.
Handouts: Session summary and *Stimulus Control instructions.*

Homework 10 minutes

Implement *Stimulus Control* procedures.
Continue with *Better Sleep Guidelines* and previous strategies for anxiety.

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Group Therapy for Anxiety-related Insomnia
Anxiety-First Group—Wednesdays

Session Seven

Aims:

- Ensure participants' understanding of the relationship between thoughts and emotions as understood from a cognitive framework, and the mechanisms through which they filter our perception.
- Identify any unhelpful beliefs about sleep participants hold.
- Introduce participants to the concept of "faulty cognitions".
- Challenge those beliefs in session and provide tools so participants can challenge them at home also.

Psychometrics (on arrival) 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)
- Dysfunctional Beliefs and Attitudes about Sleep-16 (16 items)

Review Fernanda—30 minutes

Review implementation of *Stimulus Control* recommendations.

- Discuss obstacles or difficulties faced.
- Clarify rationale and empirical support of therapy (incl. sleep gets worse before getting better).

Review ongoing use of *Better Sleep Guidelines* and previous strategies for anxiety.

Theory Duncan—30 minutes

Re-introduce concept of faulty cognitions in the five-part model.

- Influence on behaviours and emotions.
- Catastrophising, overgeneralisation, dichotomous thinking, personalising, negative focus, jumping to conclusions, fixed rules.
- Re-introduce concept of challenging negative automatic thinking.

Discuss the five common misconceptions about sleep (Morin, 1993)

- Causes.
- Consequences.
- Unrealistic expectations.
- Control and predictability of sleep.
- Sleep-promoting practices.

10 minute break

Application Fernanda—30 minutes

Review participants' DBAS-16 answers together.

- Identify most disruptive beliefs and misconceptions about sleep.
- Examine behaviours that serve to confirm those distorted beliefs.

Discuss strategies (in session)/experiments (homework) designed to begin changing these.

- Obtaining accurate information about sleep.
- Identifying negative automatic thoughts.
- Challenging negative thoughts and rehearsing alternative beliefs.

Questions and wrap-up.
Handouts: Session summary and *Experiment Sheet.*

Homework 10 minutes

Cognitive intervention experiments.

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Continue with *Better Sleep Guidelines* and *Stimulus Control* and previous strategies for anxiety.

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Group Therapy for Anxiety-related Insomnia
Anxiety-First Group—Wednesdays

Session Eight

Aims:

- Finalize cognitive restructuring and identify overlooked areas.
- Consolidate learning.
- Create relapse prevention plan.
- Obtain feedback.

Psychometrics (on arrival) 10 minutes

- Insomnia Severity Index (7 items)
- Depression Anxiety Stress Scale-21 (21 items)
- Dysfunctional Beliefs and Attitudes about Sleep-16 (16 items)

Review Duncan—30 minutes

Review cognitive intervention homework experiment.

- discuss obstacles or difficulties faced.
- provide assistance with overcoming obstacles through reinforcement of theory behind this or brainstorming more balanced alternative beliefs (depending on issues participants experienced).

Review ongoing *Better Sleep Guidelines* and *Stimulus Control* work.

- Identify areas overlooked in previous sessions and address these if possible.
- Discussion on impact of changes in participants' routines.

Theory Fernanda—30 minutes

Maintenance plan for relapse prevention.

- Group members are asked to share the progress they have made, what have they learned and what important experiences they will take with them. This will be based on the following questions:
  1. Think back to when you first started treatment. What gains or accomplishments have you made over the past 10 weeks? What goals have you achieved? What obstacles have you overcome?
  2. What do you need to keep working on after the group ends? What are the situations or experiences that you would like to tackle?
  3. What key information or phrases did you learn in the group that you need to take with you to keep you going?

10 minute break

Application Duncan—30 minutes

Making a development and maintenance plan.

Participants are handed a piece of paper where they can write about the maintenance plan.

- Make a graded hierarchy of situations that may be problematic now and in the future.
- Plan regular exercises in relaxation, exposure, giving up avoidance and safety behaviour, behavioural experiments and cognitive restructuring work.
- Identify anything we have not covered here that you would like help with.

- Plan systematic work to continue what you have started in this program.
- Make a list of possible setbacks and make a plan to deal with them.
- List new problematic situations that could occur in the future and make a plan to deal with them.

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Handouts: Session summary and *Relapse Prevention Plan.*

Homework 2 minutes

Continue the good work...

- Self-monitoring,
- Behavioural experiments
- Cognitive restructuring.
- Exposure and relaxation

Feedback 10 minutes

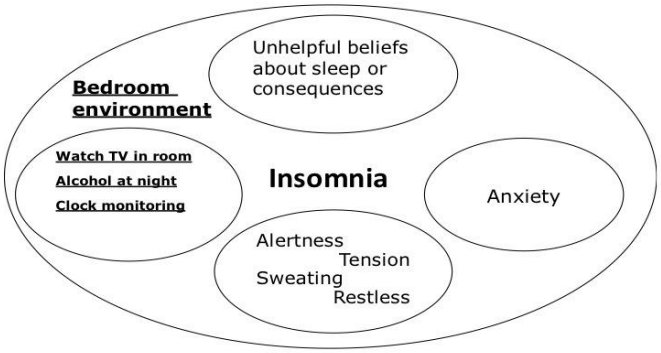
All participants fill in the feedback form.

Research participants only:
Quality of Life of Insomniacs questionnaire filled in immediately, before departing.
Sleep Diaries given with reply-paid envelope to post them back after completed in two weeks.

Appendix C

Insomnia first handouts

Group Therapy for Anxiety-related Insomnia
Session One Handout



- Insomnia is a difficulty in initiating or maintaining sleep.
- It is accompanied by feelings of "unrefreshing sleep".
- 25.1% of New Zealanders report chronic sleep problems.
- Between 25-42% of insomnia sufferers have anxiety problems as well.
- Each individual in different and have their own sleep pattern.
- Once it sets in, insomnia is maintained and made worse by several factors that interact with each other. For instance, how much we believe we should be sleeping every night, our uncomfortable or overcrowded bed, feeling tense in our bodies, working or studying in bed and feeling anxious in general.
- Insomnia can be treated and people respond differently to treatment, some improving faster than others; this is normal and expected.
- What *you* do in the other 166 hours of the week will make the difference.
- Today you learned some tips to help you sleeping better at night.

HOMEWORK: *Better Sleep Guidelines*

Better Sleep Guidelines

1. **Sleep only as much as you need to feel refreshed the following day**. Restricting your time in bed helps consolidate and deepen your sleep. Excessively long time in bed lead to fragmented and shallow sleep.

2. **Get up at the same time, 7 days a week.** Get up at the same time every day, *no matter how little you slept*. A regular wake time in the morning leads to regular times of sleep onset and helps set your "biological clock".

3. **Exercise regularly but not prior bedtime.** Regular daily exercise makes it easier to initiate and deepen sleep. However, do schedule exercise times so that they *do not occur within three hours of when you intend to go to bed*.

4. **Ensure light and noise levels in bedroom are comfortable.** A comfortable, noise-free sleep environment will reduce the likelihood that you will wake up during the night. Noise that does not awaken you may still disturb the quality of your sleep.

5. **Ensure bedroom temperature is comfortable.** Excessively hot or cold sleep environment may disturb sleep.

6. **Eat regular meals during the day and avoid heavy meals at night.** Hunger may disturb sleep. A light snack at bedtime (especially carbohydrates) may help sleep, but *avoid greasy and heavy meals* as your body will be busy digesting it instead of resting.

7. **Avoid excessive liquids intake during evening.** This will minimise night-time trips to the bathroom.

8. **Reduce caffeine intake and/or avoid it after mid-afternoon.** Caffeinated beverages and foods (coca-cola, chocolate, black tea and coffee) can cause difficulty falling asleep, awakenings at night and shallow sleep.

9. **Avoid alcohol intake in the evenings.** Although alcohol intake seems to relax tense people and induce sleep, *it does cause awakening later in the night*.

10. **Avoid smoking prior to bedtime.** Nicotine is a stimulant and it prevents you from falling asleep.

11. **Don't take your worries to bed with you.** Worrying interferes with initiating sleep and produces shallow sleep. Deal with them at least one hour prior to bedtime and then leave them for the next day.

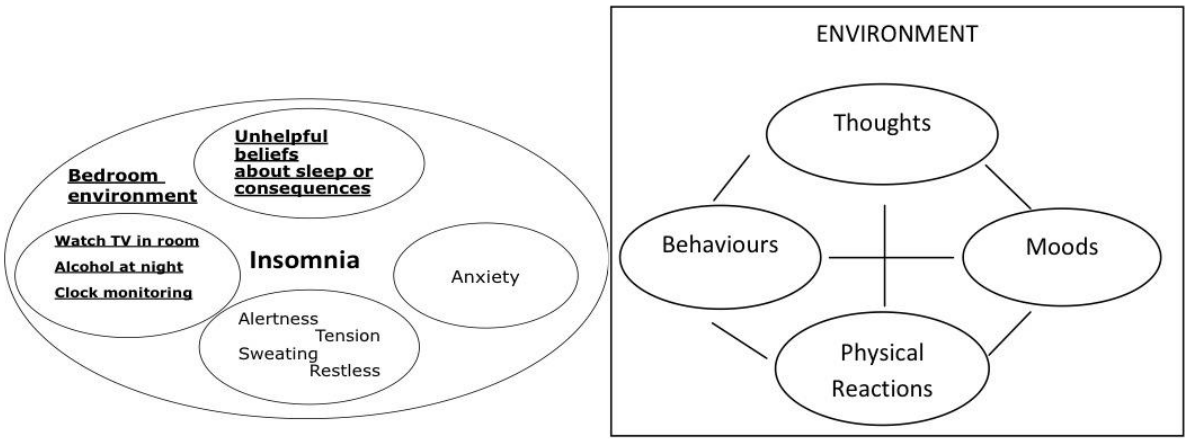
12. **Use the bed/bedroom for sleep only.** This will help associate bed with sleep instead of stimulating activities such as watching TV or discussing important matter with partner or over the phone.

13. **Do not try to fall asleep; let it happen naturally.** This only makes the problem worse. Instead, get up and leave the room. Do some quiet activity and come back after about 20 minutes or when you are feeling sleepy.

14. **Hide the clock so you don't monitor it.** Clock monitoring may only lead to frustration, anger and worry, which all interfere with sleep.

15. **Do not nap during the day.** Staying awake during the day will help you feeling sleepy at night.

Group Therapy for Anxiety-related Insomnia
Session Two Handout



- Sleep is affected by **Thoughts**, **Emotions**, **Physiological sensations**, **Behaviours** and **Environment**; they all interfere with insomnia as well as with each other. Changing our behaviours and thoughts help changing how we feel.
- First we begin by changing our behaviours and environment as much as we can.
- Today you learned how to re-associate bed/bedroom with sleep in addition to following the *Better Sleep Guidelines*.

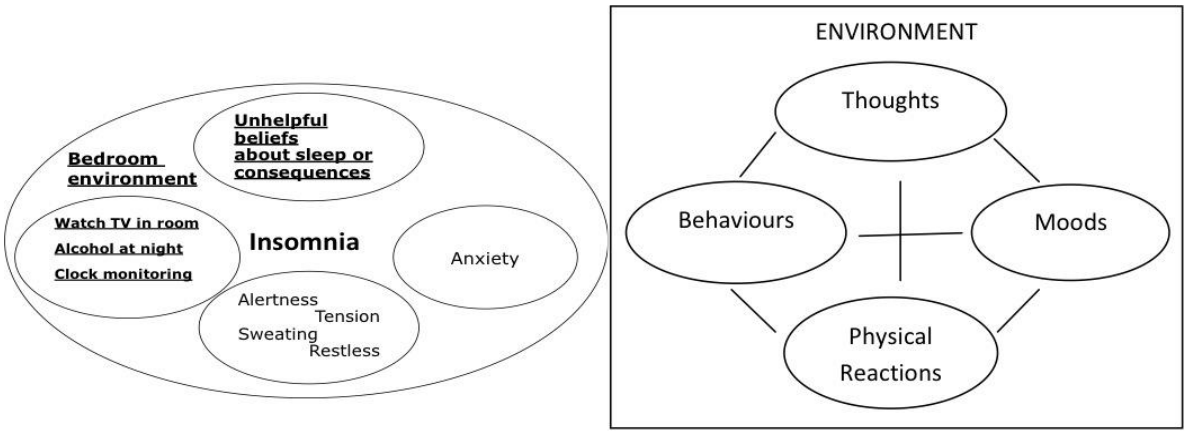
  HOMEWORK: *Stimulus Control* and *Better Sleep Guidelines.*

Stimulus Control

1. Go to bedroom and lie down only when you are tired and sleepy. The goal is to associate bed with falling asleep quickly.
2. Do not use your bed/bedroom for anything but sleep and sex. Sex is ok; however, if you do not feel sleepy afterwards then follow these instruction and return to bed/bedroom later.
3. Do not read, watch TV, eat, talk on phone or worry in bed.
4. If you find yourself unable to fall asleep, get up and go to another room. Do not stay in bed and try to sleep.
5. Do not watch the clock but if you don't fall asleep within about 10 minutes, get out of bed. Remember that the goal is to associate bed with falling asleep quickly and not worrying about how long it takes for you to sleep.
6. After a 20 minute break in another room go back to bed and repeat step 5. Do this as often as needed during the night. Remember the "Better Sleep Guidelines" and do not engage in stimulating activities; herbal teas or warm milk can be taken but not in excess (to avoid waking for trips to the toilet).
7. Set you alarm at a reasonable time and get up at that same time every day, regardless of the time you actually fell asleep.
8. Do not nap during the day as this will affect how sleepy you feel at night.

Group Therapy for Anxiety-related Insomnia

Session Three Handout

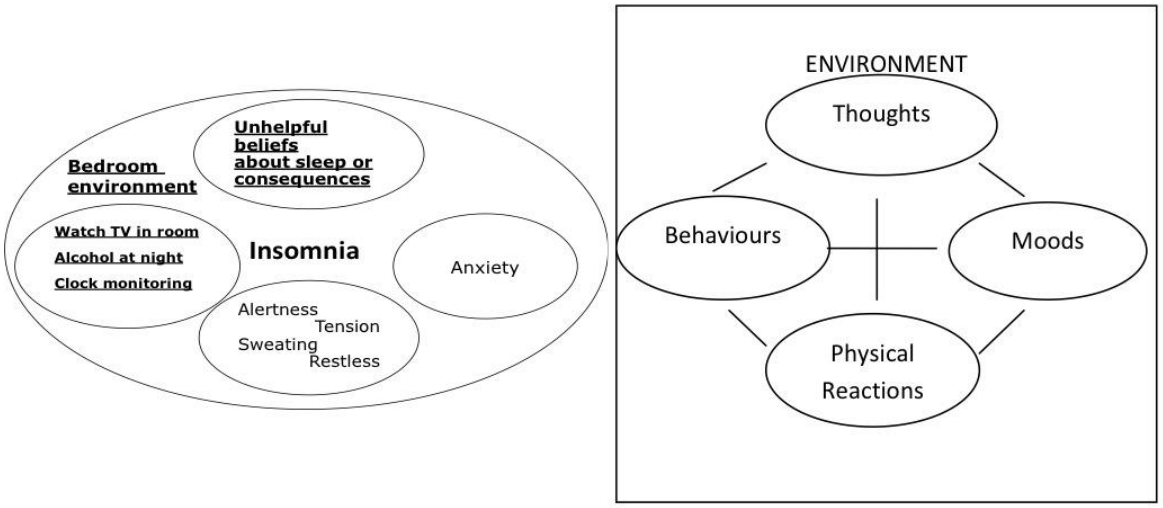


- Thoughts are very important in determining how we feel, what we choose to do and not to do.
- They also affect our biological responses.
- Some types of thinking are unhelpful and serve to increase our distress. When we know these "mistakes" we make, then we can change them.
- Most common misconceptions about sleep are regarding:
    a) Causes
    b) Consequences
    c) Unrealistic expectations
    d) Control and predictability of sleep
    e) Sleep-promoting practices
- Today you learned some of our own unhelpful thoughts and how you can change them.

HOMEWORK: Experiment and continue with *Stimulus Control* and *Better Sleep Guidelines*

Group Therapy for Anxiety-related Insomnia

Session Four Handout



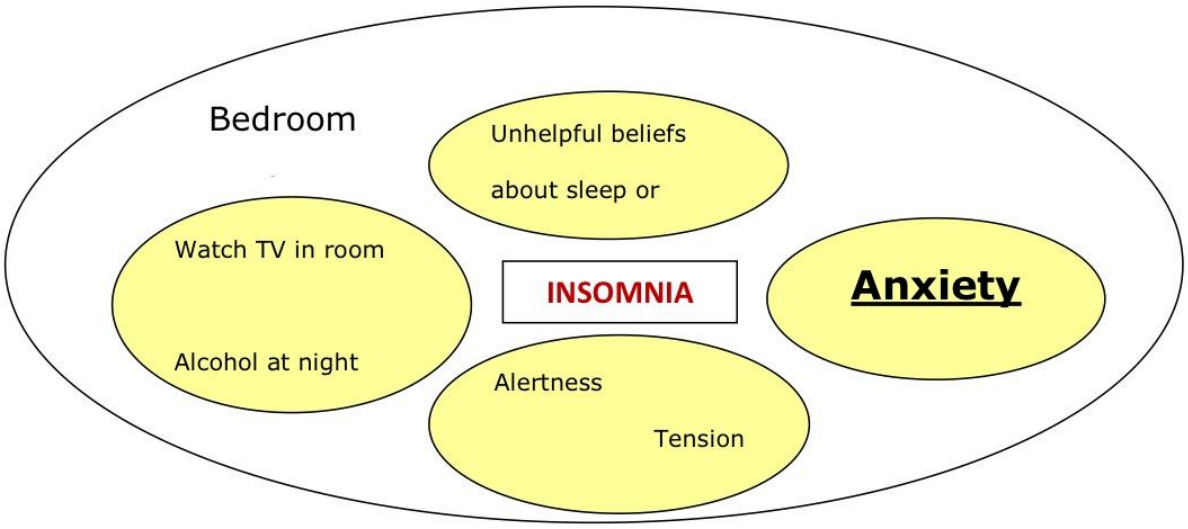
- Changing our thoughts can be difficult but it can be done. When challenging negative automatic thoughts, it is our balanced alternate beliefs need to be *well targeted* (challenging the negative thought, not something else) and *believable.* It may be necessary to acknowledge the things you are not happy about; unrealistically positive thoughts will not effectively challenge negative thoughts to change how you are feeling.
- How can you eliminate the obstacles that stop you from changing your thoughts and behaviours?
- Changing takes time and sometimes you get worse before you get better. *This is absolutely normal and expected.*
- What you do in the other 166 hours of the week makes all the difference.
- What changes have you made so far? Where else can you make changes?
- All you have learned here is now part of your routine. Keep it up! Remember our Insomnia model and how it is influenced by our all the different factors that also interact with each other. You must keep an eye on all aspects and adjusts the changes you need to make.

HOMEWORK: Complete your *Sleep Diary* every morning, as soon as possible after waking up, for the following two weeks and bring it to your therapist in the next session. Continue with *Challenging your thoughts, Stimulus Control* and *Better Sleep Guidelines.*

Group Therapy for Anxiety-related Insomnia

Session Five Handout

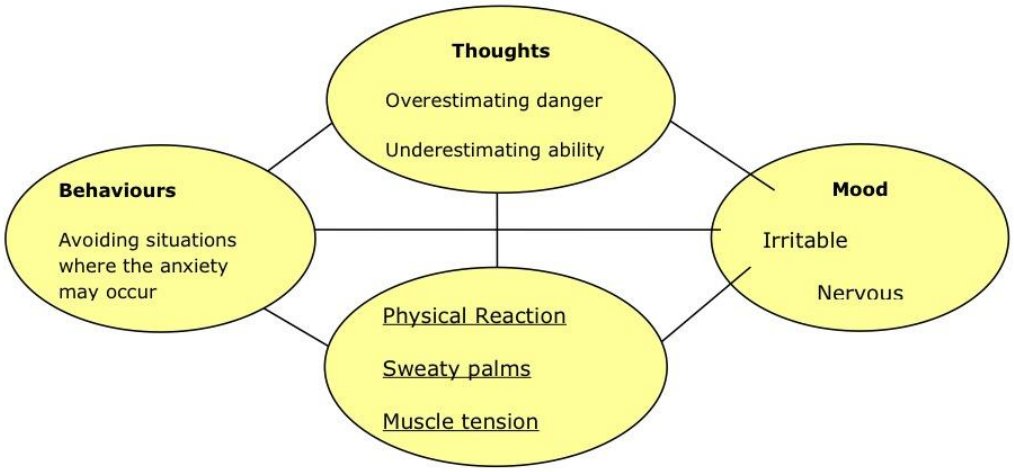
INSOMNIA MODEL



- Insomnia is a difficulty in initiating or maintaining sleep.
- It is accompanied by feelings of "unrefreshing sleep".
- 25.1% of New Zealanders report chronic sleep problems.
- Between 25-42% of insomnia sufferers have anxiety problems as well.
- Anxiety is a major contributor of insomnia. When we are anxious our heart may beat fast, our breathing may be rapid, we may sweat and we are prepared for "fight or flight".
- This feeling of anxiety and state of arousal is incompatible with the resting state that should be present before falling asleep. For this reason treatment of anxiety is expected to also improve sleep.
- Anxiety can be treated by targeting each of the five aspects of the "five-part model".
- Today, you learnt relaxation to better control physiological arousal.
- Next session, you will learn how to begin to manage behaviours that otherwise maintain anxiety, such as avoidance and escape.
- In a later session you will learn how to change thoughts in order to interrupt the chain of reaction caused by the anxious thoughts.
- What *you* do in the other 166 hours of the week will make the difference.

1. Homework: *Relaxation everyday for 30 minutes before sleep. Identify situations and/or thoughts that cause anxiety or that you avoid. Reading on CBT model of Anxiety*

CBT ANXIETY MODEL



What is anxiety?

- Anxiety is a normal reaction that happens to everyone at times of danger or in worrying situations. When you are anxious your bodily system speeds up. In certain circumstances this can be a definite advantage as it enables people to respond rapidly. Our goal is not to eliminate anxiety. A moderate amount of anxiety is *normal* often actually improves your performance.

- Anxiety becomes problematic when it interferes with our performance or our everyday lives. This is when it becomes necessary to learn how to control it. Remember that anxiety is a normal necessary reaction. You cannot banish it completely from your life but you can learn to manage it.

- When we feel anxious a chain of automatic events occur in our bodies, which prepare us for action. This reaction is often called the "flight and fight" response and can be traced back to our evolutionary past. Imagine the primitive caveman threatened by a wild animal! He needs to be prepared for action: to run or to fight. We still possess this survival reaction, although it is now triggered by subtler situations—some of which we are not consciously aware of.

- The chain of reaction in anxiety consists of the following:

  A **Situation** (possibly dangerous) leads to a **Thought** (interpretation of event as definitely dangerous) which leads to brain sending a message to pump adrenaline into blood stream and into large skeletal muscles of the arms and legs. The heart beats, we breathe faster, and we sweat to cool the body. This is what we call **Physiological Arousal.** When this chain of events occurs in a normal situation it can be very frightening, hence we feel **Anxious.** The important thing to remember is that the physical symptoms are natural and not harmful, but are appearing in an inappropriate situation.

- Anxiety is a common problem. One in four people have at least one diagnosable anxiety disorder.

- Cognitive behavioural therapy can help manage these symptoms by teaching new skills such as relaxation and exposure to situations that are feared but are not necessarily dangerous. You will also learn to stop safety behaviours and challenge anxious thoughts.

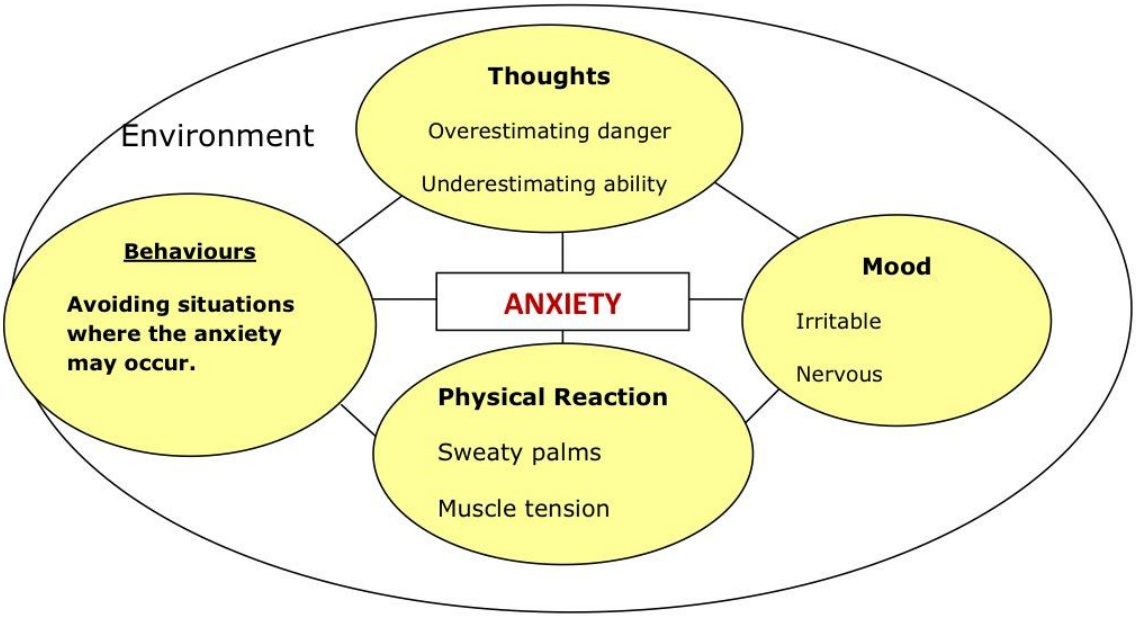
RELAXATION

- Relaxation is a technique we can learn and use to release physical bodily tension, which otherwise causes mental tension.
- There is a strong relationship between the body and the mind. When we get anxious or stressed our bodies get tense, we don't breathe properly, our heart start pump, we might start to perspire: all these factors are evidence of stress.
- Relaxation can be learnt in two stages and is different from sleep. The first stage involves learning complete physical relaxation, the second stage means using this to promote calm in our mind to enable us to deal with thoughts which cause tension.
- Relaxation is a good habit to learn and it can be used at any time during the day. It can help make you aware of the effects of stress, enabling you to control them, it can help improve your breathing control, your concentration and control of thoughts and help you become aware of the way tension affects various parts of your body.

Relaxation Guidelines

1. Find a quiet place where you can rest undisturbed for 30 minutes. Initially choose a room other than your bedroom. Let others know you need this time for yourself.
2. Make sure the setting is relaxing. For example, dim the lights if you like, and find a comfortable chair or couch.
3. Turn on the CD player .
4. Get into a comfortable position where you can relax your muscles and follow instructions given on the CD.
5. Close your eyes and clear your mind of distractions.

Group Therapy for Anxiety-related Insomnia
Session Six Handout



- Anxiety results from an interaction between **thoughts**, **emotions**, **physiological sensations**, **behaviours** and **environment**.
- Behaviours include leaving situations when anxiety might/begins to occur.
- First we begin by changing our behaviours and environment as much as we can.
- Today you learned skills that will help you to stop avoiding anxiety provoking situations.
- Exposure to feared stimuli is the most effective way to test the truthfulness of anxious thoughts and to become used to previously anxiety-provoking stimuli.
- Exposure will over time lead to decreased anxiety.

HOMEWORK: *Exposure practice* and *relaxation (30 minutes every day)*

EXPOSURE THERAPY

- People with anxiety often engage in a wide range of behaviours designed to protect themselves from perceived threat. These may include subtle avoidance behaviour (e.g., distraction, wearing extra make up to hide blushing), carrying safety objects (e.g., simply carrying medication, even when they do not take it regularly), overuse of drugs and alcohol, and using compulsive rituals such as repeated checking and cleaning (such as in people with obsessive compulsive disorder).

- A successful method to overcome avoidance and desensitise you to things that made you anxious is known as exposure therapy.

- Exposure is appropriate when the "dangers" you are avoiding are not really as objectively dangerous as you feel them to be.

- Exposure is a simple principle. You convince yourself to not avoid your fears, but rather to face them directly. You help yourself endure your fear experience, face your fears and remain in the feared situation. The goal is to help yourself remain in contact with your fear experience until you realize that what you thought was dangerous is not actually so bad after all—maybe not wonderful, but really not so bad as you thought. When you are in an anxiety-provoking situation, it is important that you *remain there* (using your relaxation techniques and other skills to help you to cope) until your anxiety begins to subside.

- The success of exposure therapy depends on the occurrence of phenomena called habituation. Habituation is a natural human and animal neurologically based tendency to get used to whatever you are exposed to for a long time. Habituation is what allows you to not notice common loud noises in your home environment (street noise, barking dogs, etc.) that would keep a visitor up all night. Just like people can get used to noises that initially upset their sleep, they can also get used to fear feelings, so long as they remain exposed to those fear feelings for a long enough time.

- Habituation is a sort of relaxation process. Like any relaxation, it doesn't occur immediately, but rather takes some time to develop. It occurs as people remain in the midst of their fear, and come to realize that nothing actually dangerous is occurring. Habituation promotes new learning of safety, toleration for fear feelings, and extinction of the fear avoidance urge.

EXPOSURE GUIDELINES

1. Teach yourself how to relax deeply using relaxation methods we learned last week.

2. Pick something you're afraid of, and then list ten or so situations concerning that thing that make you anxious. Rank order them from the least frightening situation to the most fear-inducing situation. You had the opportunity to do this in the group session today but do not stop there! You can make an exposure hierarchy and apply exposure for any situation that you identify in the future.

3. A starting point is often "imaginal exposure"—imagining the situation you are frightened of. Starting with the least frightening situation on your hierarchy, imagine it as fully as you can, while practicing your relaxation technique. Do what you can to provoke the normal discomfort you'd feel while contemplating that feared situation, but remain relaxed through this period. Do this several times, over several days, until it is relatively easy for you to remain relaxed while intensely focused on the fearful situation.

4. When you have mastered the first situation (master to boredom), move up step-wise to the next most fearful situation, and repeat the process of thinking about that situation while remaining relaxed.

5. Continue this process until you have mastered the ability to remain relaxed and calm even though you are contemplating the most feared situation on your list.

6. The other approach is to follow the same procedures as the imaginal exposure but instead expose yourself to the real situation.

7. Space exposure occasions close together—the best way you can ensure success is to apply exposure daily.

8. Duration of exposure should be long enough for the fear to decrease to the point you feel comfortable. Beware of making an early escape—it is just another form of avoidance!

9. Use gradual exposure to ensure that anxiety is not too overwhelming during practice, but make sure that the steps you take are not so small that they undermine treatment gains and reduce motivation.

10. Preventing safety behaviours and rituals is essential because these behaviours can undermine the effects of exposure, and eliminating those leads to quicker improvement.

11. We recommend that the intensity of fear experienced during exposure start at moderate to high range (e.g., rating between 70 to 100)

12. It is important you apply exposure in a variety of environments. We recommend you practice exposure at home, work and other places where you are likely to encounter situations that you fear.

Group Therapy for Anxiety-related Insomnia
Session Seven Handout

The ABC of Thinking Straight

A	B	C
An activating event	**The thought/belief**	**Emotional consequence**
Forgetting to buy something	I'm useless! I'll never do anything right.	Feeling of anxiety/failure

- Activating events do not lead directly to consequences—it is the way we *interpret* the situation that will determine the consequence.
- Often our thoughts can go unrecognized and we fail to realize the importance they play in the way we feel and behave.
- Thoughts are a major determinate of which *mood* (emotion) we will experience in a given situation.
- Thoughts influence how we *behave*, what we choose to do and not to do, and how well we do it.
- Thoughts and beliefs affect our *physiological responses* as well.

- When we have negative thoughts, we usually dwell on data that confirm our conclusion.
- It is helpful for you consider your "hot thoughts" as hypotheses or guesses.
- Thought records provide an opportunity to develop new ways of thinking that can lead to feeling better.
- As in developing any new skill, you will need to practice identifying and challenging your thoughts (e.g. through completing many thought records) before consistent results will be achieved.
- Do not be discouraged if there is no instant result. It takes time to develop a new skill; that is expected and normal.
- There are two main underlying thoughts that lead to the feeling of anxiety: overestimation of threat, and catastrophising.
- Anxiety can be reduced either by decreasing your perception of danger or increase your confidence in the ability to cope with threat.
- Overestimation of threat can be challenged through examining evidence supporting the thought and evidence that disconfirms it.
- *HOMEWORK: Relaxation, Exposure, Challenging thoughts (experiment, thought record)*

Example:

<u>Probability Overestimation</u>: I will make a fool of myself during the presentation.

<u>Initial anxiety level</u>: 80 out of 100

<u>Supporting evidence</u>:

1. I often lose my train of thoughts,

2. Sometimes people tell me I looked anxious following a presentation.

3. I feel like a fool when I'm anxious in front of others

<u>Disconfirming Evidence:</u>

1. **I keep getting invited to give presentations, so I must be doing something right**
2. **When I collect formal evaluations for my presentations, most people in the audience tend to be happy with my performance.**
3. **Presentations are just a small part of my job. As long as I do the rest of my job well, I can afford to have my presentations be less than perfect.**

<u>Revised Belief:</u>

"Although my presentation may not be perfect I am unlikely to make a fool of myself".

<u>Revised Anxiety Level</u>:

40 out of 100

- Catastrophic thinking can be challenged by asking questions designed to put things in perspective. Example:

  What if_____did happen?

  Would that really be as bad as I expected?

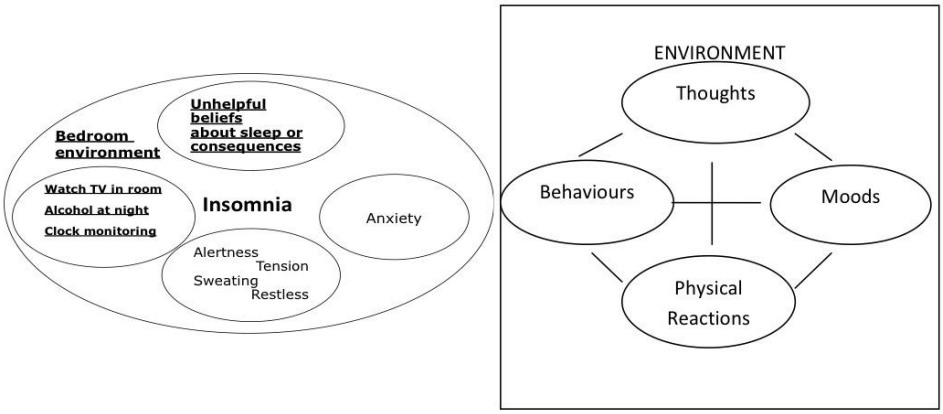
  Would it matter the next day? The next week?

- Anxiety provoking thoughts can also be challenged by <u>behavioural experiments</u> which involve setting up a mini-experiment to test the validity of the belief in the way that a scientist might test a hypothesis.

  Example: Purposely leaving long pauses in a conversation to challenge the belief that one must always keep a conversation moving.

Group Therapy for Anxiety-related Insomnia

Session Eight Handout



- Changing our thoughts can be difficult but it can be done.
- How can you eliminate the obstacles that stop you from changing your thoughts and behaviours?
- Changing takes time and sometimes you get worse before you get better. *This is absolutely normal and expected.*
- What you do in the other 166 hours of the week makes all the difference.
- What changes have you made so far? Where else can you make changes?
- All you have learned here is now part of your routine. Keep it up! Remember our Insomnia model and how it is influenced by our all the different factors that also interact with each other. You must keep an eye on all aspects and adjusts the changes you need to make.

HOMEWORK: Complete your *Sleep Diary* every morning, as soon as possible after waking up, for the following two weeks and post it back to the clinic in the reply-paid envelope provided.

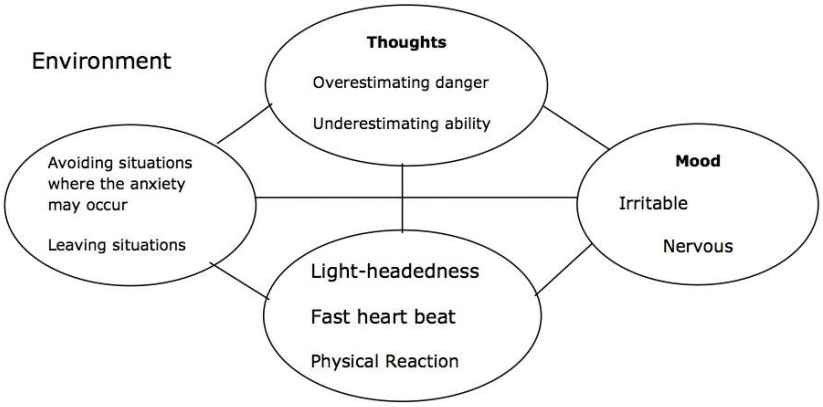
Appendix D

Anxiety first handouts

Group Therapy for Anxiety-related Insomnia

Session One Handout

CBT ANXIETY MODEL



What is anxiety?

- Anxiety is a normal reaction that happens to everyone at times of danger or in worrying situations. When you are anxious your bodily system speeds up. In certain circumstances this can be a definite advantage as it enables people to respond rapidly. Our goal is not to eliminate anxiety. A moderate amount of anxiety is *normal* often actually improves your performance.
- Anxiety becomes problematic when it interferes with our performance or our everyday lives. This is when it becomes necessary to learn how to control it. Remember that anxiety is a normal necessary reaction. You cannot banish it completely from your life but you can learn to manage it.
- When we feel anxious a chain of automatic events occur in our bodies, which prepare us for action. This reaction is often called the "flight and fight" response and can be traced back to our evolutionary past. Imagine the primitive caveman threatened by a wild animal! He needs to be prepared for action: to run or to fight. We still possess this survival reaction, although it is now triggered by subtler situations—some of which we are not consciously aware of.
- The chain of reaction in anxiety consists of the following:

A **Situation** (possibly dangerous) leads to a **Thought** (interpretation of event as definitely dangerous) which leads to brain sending a message to pump adrenaline into blood stream and into large skeletal muscles of the arms and legs. The heart beats, we breathe faster, and we sweat to cool the body. This is what we call **Physiological Arousal.** When this chain of events occurs in a normal situation it can be very frightening, hence we feel **Anxious.** The important thing to remember is that the physical symptoms are natural and not harmful, but are appearing in an inappropriate situation.

- Anxiety is a common problem. One in four people have at least one diagnosable anxiety disorder.
- Cognitive behavioural therapy can help manage these symptoms by teaching new skills such as relaxation and exposure to situations that are feared but are not necessarily dangerous. You will also learn to stop safety behaviours and challenge anxious thoughts.

RELAXATION

- Relaxation is a technique we can learn and use to release physical bodily tension, which otherwise causes mental tension.
- There is a strong relationship between the body and the mind. When we get anxious or stressed our bodies get tense, we don't breathe properly, our heart start pump, we might start to perspire: all these factors are evidence of stress.
- Relaxation can be learnt in two stages and is different from sleep. The first stage involves learning complete physical relaxation, the second stage means using this to promote calm in our mind to enable us to deal with thoughts which cause tension.
- Relaxation is a good habit to learn and it can be used at any time during the day. It can help make you aware of the effects of stress, enabling you to control them, it can help improve your breathing control, your concentration and control of thoughts and help you become aware of the way tension affects various parts of your body.

Relaxation Guidelines

1. Find a quiet place where you can rest undisturbed for 30 minutes. Initially choose a room other than your bedroom. Let others know you need this time for yourself.
2. Make sure the setting is relaxing. For example, dim the lights if you like, and find a comfortable chair or couch.
3. Turn on the CD player .
4. Get into a comfortable position where you can relax your muscles and follow instructions given on the CD.
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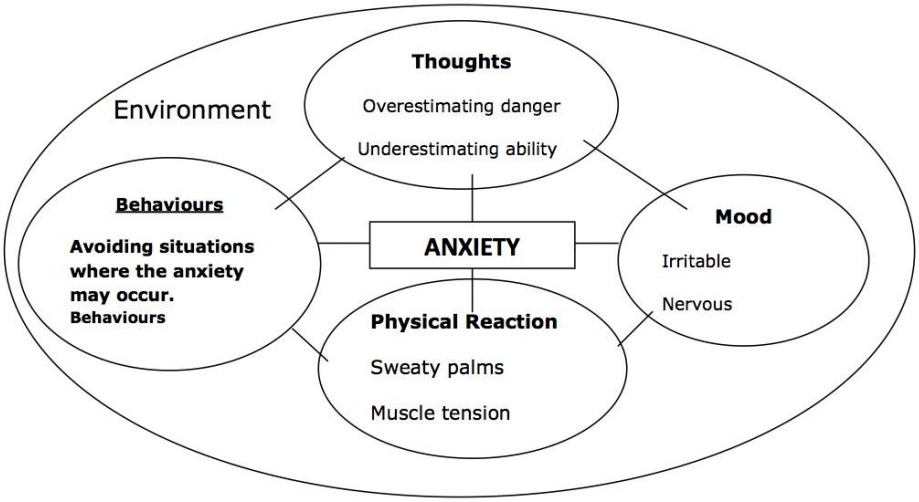
Group Therapy for Anxiety-related Insomnia

Session Two Handout



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- Behaviours include leaving situations when anxiety might/begins to occur.
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- Exposure to feared stimuli is the most effective way to test the truthfulness of anxious thoughts and to become used to previously anxiety-provoking stimuli.
- Exposure will over time lead to decreased anxiety.

HOMEWORK: *Exposure practice* and *relaxation (30 minutes every day)*

EXPOSURE THERAPY

- People with anxiety often engage in a wide range of behaviours designed to protect themselves from perceived threat. These may include subtle avoidance behaviour (e.g., distraction, wearing extra make up to hide blushing), carrying safety objects (e.g., simply carrying medication, even when they do not take it regularly), overuse of drugs and alcohol, and using compulsive rituals such as repeated checking and cleaning (such as in people with obsessive compulsive disorder).

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- Habituation is a sort of relaxation process. Like any relaxation, it doesn't occur immediately, but rather takes some time to develop. It occurs as people remain in the midst of their fear, and come to realize that nothing actually dangerous is occurring. Habituation promotes new learning of safety, toleration for fear feelings, and extinction of the fear avoidance urge.

EXPOSURE GUIDELINES

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2. Pick something you're afraid of, and then list ten or so situations concerning that thing that make you anxious. Rank order them from the least frightening situation to the most fear-inducing situation. You had the opportunity to do this in the group session today but do not stop there! You can make an exposure hierarchy and apply exposure for any situation that you identify in the future.
3. A starting point is often "imaginal exposure"—imagining the situation you are frightened of. Starting with the least frightening situation on your hierarchy, imagine it as fully as you can, while practicing your relaxation technique. Do what you can to provoke the normal discomfort you'd feel while contemplating that feared situation, but remain relaxed through this period. Do this several times, over several days, until it is relatively easy for you to remain relaxed while intensely focused on the fearful situation.
4. When you have mastered the first situation (master to boredom), move up step-wise to the next most fearful situation, and repeat the process of thinking about that situation while remaining relaxed.
5. Continue this process until you have mastered the ability to remain relaxed and calm even though you are contemplating the most feared situation on your list.
6. The other approach is to follow the same procedures as the imaginal exposure but instead expose yourself to the real situation.
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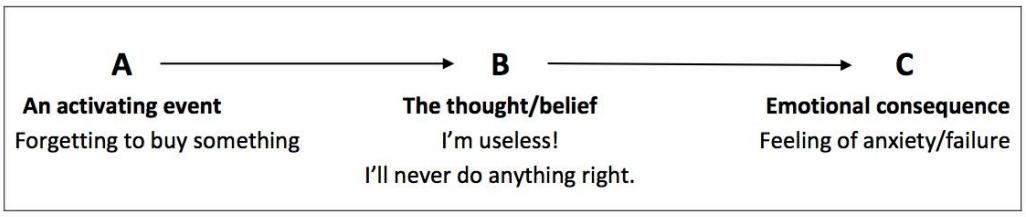
11. We recommend that the intensity of fear experienced during exposure start at moderate to high range (e.g., rating between 70 to 100)
12. It is important you apply exposure in a variety of environments. We recommend you practice exposure at home, work and other places where you are likely to encounter situations that you fear.

Group Therapy for Anxiety-related Insomnia
Session Three Handout

The ABC of Thinking Straight



- Activating events do not lead directly to consequences—it is the way we *interpret* the situation that will determine the consequence.
- Often our thoughts can go unrecognized and we fail to realize the importance they play in the way we feel and behave.
- Thoughts are a major determinate of which *mood* (emotion) we will experience in a given situation.
- Thoughts influence how we *behave*, what we choose to do and not to do, and how well we do it.
- Thoughts and beliefs affect our *physiological responses* as well.

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- It is helpful for you consider your "hot thoughts" as hypotheses or guesses.
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- Overestimation of threat can be challenged through examining evidence supporting the thought and evidence that disconfirms it.
- *HOMEWORK: Relaxation, Exposure, Challenging thoughts (experiment, thought record)*

Example:

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<u>Revised Belief:</u>

"Although my presentation may not be perfect I am unlikely to make a fool of myself".

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- Catastrophic thinking can be challenged by asking questions designed to put things in perspective. Example:

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  Would that really be as bad as I expected?

  Would it matter the next day? The next week?

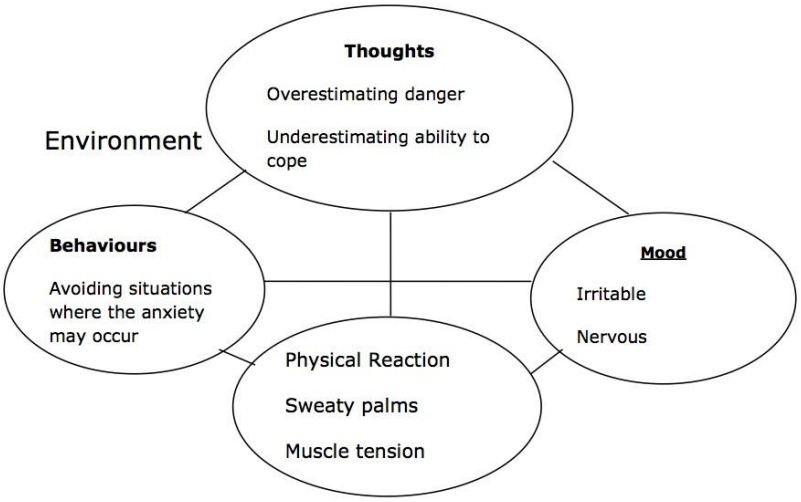
- Anxiety provoking thoughts can also be challenged by <u>behavioural experiments</u> which involve setting up a mini-experiment to test the validity of the belief in the way that a scientist might test a hypothesis.

  Example: Purposely leaving long pauses in a conversation to challenge the belief that one must always keep a conversation moving.

Group Therapy for Anxiety-related Insomnia

Session Four Handout

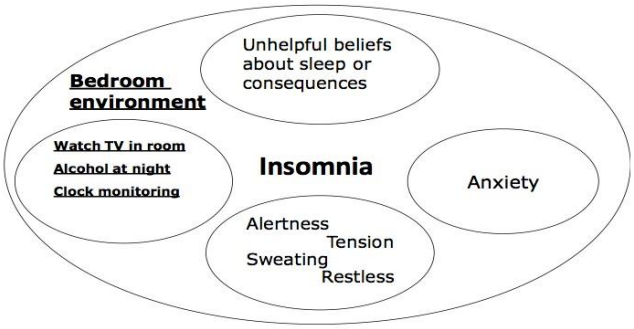
ANXIETY MODEL



- Changing our thoughts can be difficult but it can be done. When challenging negative automatic thoughts, it is our balanced alternate beliefs need to be *well targeted* (challenging the negative thought, not something else) and *believable.* It may be necessary to acknowledge the things you are not happy about; unrealistically positive thoughts will not effectively challenge negative thoughts to change how you are feeling.
- How can you eliminate the obstacles that stop you from changing your thoughts and behaviours?
- Changing takes time and sometimes you get worse before you get better. *This is absolutely normal and expected.*
- What you do in the other 166 hours of the week makes all the difference.
- What changes have you made so far? Where else can you make changes?
- All you have learned here is now part of your routine. Keep it up! Remember our ANXIETY model and how it is influenced by our all the different factors that also interact with each other. You must keep an eye on all aspects and adjusts the changes you need to make.

HOMEWORK: Complete your *Sleep Diary* every morning, as soon as possible after waking up, for the following two weeks and bring it to your therapist in the next session. Continue with *challenging your thoughts, Exposure and Relaxation.*

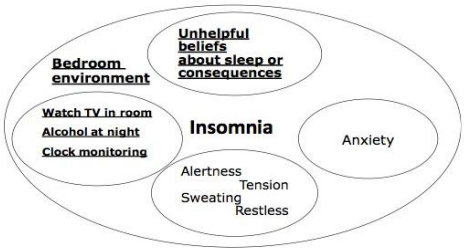
Group Therapy for Anxiety-related Insomnia
Session Five Handout

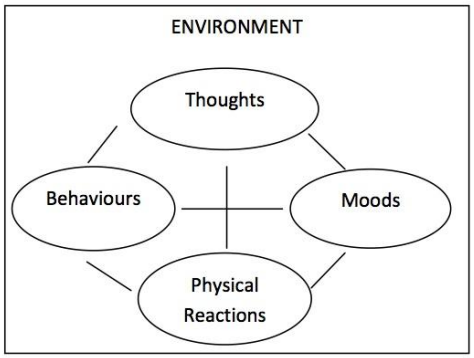


- Insomnia is a difficulty in initiating or maintaining sleep.
- It is accompanied by feelings of "unrefreshing sleep".
- 25.1% of New Zealanders report chronic sleep problems.
- Between 25-42% of insomnia sufferers have anxiety problems as well.
- Each individual is different and have their own sleep pattern.
- Once it sets in, insomnia is maintained and made worse by several factors that interact with each other. For instance, how much we believe we should be sleeping every night, our uncomfortable or overcrowded bed, feeling tense in our bodies, working or studying in bed and feeling anxious in general.
- Insomnia can be treated and people respond differently to treatment, some improving faster than others; this is normal and expected.
- What *you* do in the other 166 hours of the week will make the difference.
- Today you learned some tips to help you sleeping better at night.

HOMEWORK: *Better Sleep Guidelines* and continue with Anxiety strategies

Group Therapy for Anxiety-related Insomnia
Session Six Handout



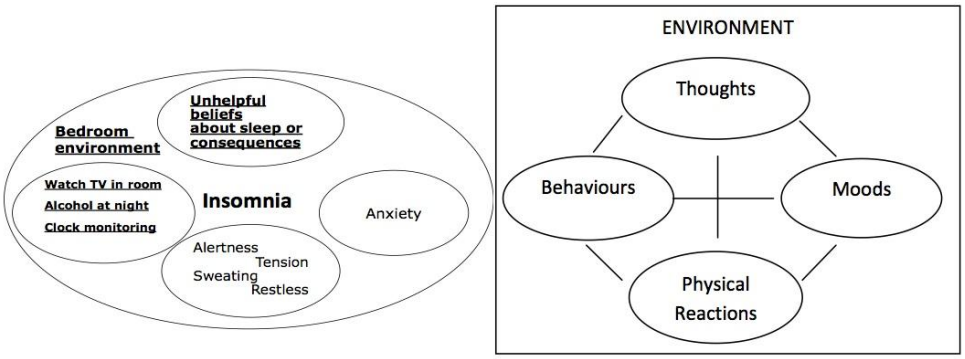


- Sleep is affected by **Thoughts**, **Emotions**, **Physiological sensations**, **Behaviours** and **Environment**; they all interfere with insomnia as well as with each other. Changing our behaviours and thoughts help changing how we feel.
- First we begin by changing our behaviours and environment as much as we can.
- Today you learned how to re-associate bed/bedroom with sleep in addition to following the *Better Sleep Guidelines*.

HOMEWORK: *Stimulus Control* and *Better Sleep Guidelines.* Continue with Anxiety strategies.

Group Therapy for Anxiety-related Insomnia

Session Seven Handout

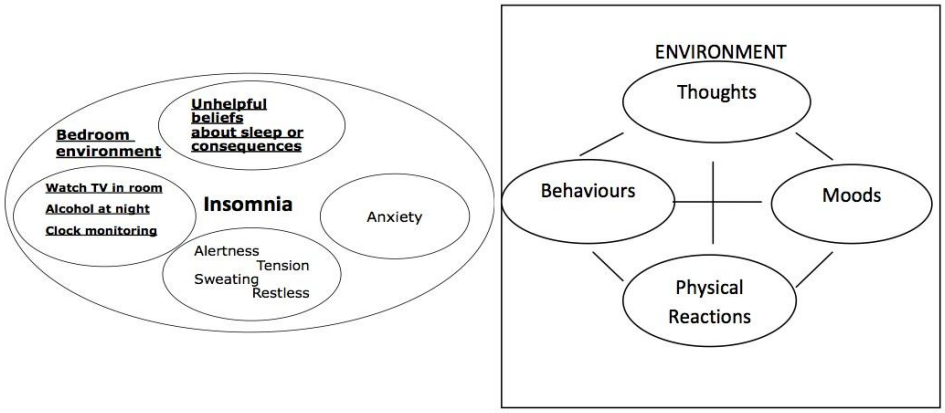


- Thoughts are very important in determining how we feel, what we choose to do and not to do.
- They also affect our biological responses.
- Some types of thinking are unhelpful and serve to increase our distress. When we know these "mistakes" we make, then we can change them.
- Most common misconceptions about sleep are regarding:
    a) Causes
    b) Consequences
    c) Unrealistic expectations
    d) Control and predictability of sleep
    e) Sleep-promoting practices
- Today you learned some of our own unhelpful thoughts and how you can change them.

HOMEWORK: Experiment and continue with *Stimulus Control* and *Better Sleep Guidelines.* Continue with Anxiety strategies.

Group Therapy for Anxiety-related Insomnia

Session Eight Handout



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