

Acceptance and commitment therapy for insomnia as a group intervention

- Predictors of treatment response

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Tutkimuksessa tarkasteltiin unettomuudesta kärsiville suunnatun ryhmämuotoisen hyväksymis- ja omistautumisterapian (HOT) onnistuneeseen hoitotulokseen vaikuttavia tekijöitä. Tarkastelun kohteena olivat tutkittavien demografiset muuttujat, psykologinen ja fyysinen hyvinvointi, unettomuuden haittaavuus, HOT:n prosessit sekä persoonallisuustekijät. Näiden muuttujien ennustavuutta hoitotulokseen tarkasteltiin ennen terapian alkua järjestetyn mittauksen ja hoidon jälkeisen seurantamittauksen tuloksia vertailemalla. Lisäksi tutkittiin, vaikuttavatko uneen viikoittainen tietoisuustaitoharjoittelu, unihygieniaohteiden soveltaminen ja arvojen mukaisten kotitehtävien tekeminen.

Tutkimuksessa tarkasteltiin 32 henkilöä ja kliinisesti merkittävää paranemista kuvattiin jakamalla tutkittavat kahteen ryhmään: terapiasta hyötynneisiin ja hyötymättömiin. Jakoperusteina käytettiin unettomuuden haittaavuuden vähentymistä (hyötynneet $n = 11$; hyötymättömät $n = 21$) sekä unipäiväkirjassa arvioitua unen keston pidentymistä (hyötynneet $n = 12$; hyötymättömät $n = 20$). Tilastollisina analyysimenetelminä käytettiin yksisuuntaista varianssianalyysia (ANOVA) ja lineaarista regressioanalyysia.

ANOVA -tulokset osoittivat, etteivät ryhmät eronneet tilastollisesti merkitsevästi toisistaan ($p > .05$). Kun hyötymisen kriteerinä oli unettomuuden haittaavuuden vähentyminen, onnistunutta hoitotulosta ennustivat kuitenkin suuntaa antavasti ($p < .10$) terapiaa edeltävä suurempi unettomuuden haittaavuus, korkeampi taipumuksellinen toiveisuus sekä terapian aikainen arvotyöskentely. Unipäiväkirjassa arvioitun unen keston pidentymisen perusteella onnistunutta hoitotulosta ennustivat suuntaa antavasti ($p < .10$) nuorempi ikä, terapiaa edeltävät vähäisemmät uneen liittyvät haitalliset uskomukset ja asenteet sekä alhaisempi tilannesidonnainen ja taipumuksellinen toiveisuus. Regressioanalyysissa sen sijaan havaittiin, että akateeminen koulutus sekä ennen terapiaa mitattu alhainen taipumuksellinen toiveisuus selittivät merkitsevästi ($p < .05$) unettomuuden haittaavuuden vähentymistä. Lisäksi havaittiin, että ennen terapiaa mitattu heikko psykologinen joustavuus ja alhainen tilannesidonnainen toiveisuus selittivät merkitsevästi arvioitun unen keston pidentymistä. Regressioanalyysissa ryhmäjako ei otettu huomioon.

Tutkimuksen perusteella hyväksymis- ja omistautumisterapia soveltuu ryhmämuotoisena interventiona heterogeenisille ryhmille. Jatkotutkimuksen kannalta tärkeää olisi kehittää uusia mittareita, jotka keskittyisivät unen ja psykologisen joustavuuden vuorovaikutuksen mittaamiseen. Lisäksi tulisi tutkia tarkemmin unettomuudesta kärsivien yleisen toiveisuuden, terapiaan ja terapeuttiin liittyvien asenteiden, terapiaan motivoitumisen ja ryhmädynamiikan yhteyttä terapiasta hyötymiseen.

Avainsanat: Hyväksymis- ja omistautumisterapia, unettomuus, ryhmäinterventio, hoitotuloksen ennustaminen

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NAAMANKA, ELINA & SUUTARI, VILLE: Acceptance and commitment therapy for insomnia as a group intervention - Predictors of treatment response

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The aim of the study was to find out if certain factors predict therapy outcome on insomniacs participating in acceptance and commitment (ACT) group therapy. Demographic variables, clinical variables related to insomnia, variables related to ACT and psychological problems in addition to health related variables were examined as the predicting factors. The results of the measurement before the group therapy began and the one month follow up were examined and compared to determine the predicting factors.

The study group consisted of 32 participants. Participants were divided into two groups of responders and non-responders in order to represent clinically significant improvement. Two outcome variables were used to estimate good and poor clinical outcome: improvement of two standard deviations in ISI scores and a 30-minute improvement in their self-evaluated duration of sleep. One-Way analysis of variance (ANOVA) and linear regression analysis were used as statistical methods.

No significant pretreatment factors between responders and non-responders that were related to treatment outcome were found with ANOVA. However, there were some suggestive results ($p < 0.10$). Responders according to improvement in insomnia severity had slightly higher insomnia severity and both higher overall dispositional hopefulness and (dispositional hopefulness with agency thinking) at pre-measurement. Furthermore, they did slightly more actions committed to values. Responders according to increase in self-evaluated duration of sleep were a bit younger, had fewer dysfunctional beliefs and attitudes about sleep, had lower (pathway thinking of) dispositional hope and lower current hopefulness at pre-measurement.

Moreover, statistically significant results ($p > .05$) from the linear regression analysis indicated that slightly higher education level and lower pretreatment dispositional hope (with agency thinking) predicted milder insomnia severity at the 1-month follow-up in responders according to improvement in insomnia severity. Likewise, lower pretreatment hopefulness, (especially agency thinking,) and lower psychological flexibility predicted greater estimated sleep time at the 1-month follow-up in responders according to improvement in their self-evaluated duration of sleep. Regression analysis was carried out without the group division.

The present study indicates that acceptance and commitment therapy as a group therapy can be helpful to a heterogeneous group of people suffering from insomnia. Further studies should consider on developing specific measurements that focus on the interaction of sleep and psychological flexibility. In addition, assessing overall hopefulness, attitudes towards therapy and the therapist, motivation towards therapy and group dynamics could be beneficial.

Keywords: Acceptance and commitment therapy, insomnia, group intervention, predicting treatment response

Table of Contents

Introduction.....	1
Methods.....	7
Subjects	7
Study design	10
Measures.....	13
Assessment of insomnia symptoms	13
Assessment of psychological symptoms and personality.....	15
Assessment of ACT processes.....	17
Intervention	20
Acceptance and Commitment Therapy	20
Therapist	20
Statistical Methods.....	21
Results.....	23
Discussion	25
Conclusions.....	33
References	34
Appendix A.....	45
Appendix B	47
Appendix C	48

Introduction

Insomnia is the most prevalent sleep disorder in the general population and can be defined as comprising several elements (Edinger et al., 2004; Schutte-Rodin, Broch, Buysse, Dorsey, & Sateya, 2008). Furthermore, it can be diagnosed as a disorder or be seen as a symptom (Schutte-Rodin et al., 2008). Sleep related symptoms of insomnia include difficulty initiating sleep, difficulty maintaining sleep, and/or sleep that is poor in quality and non-restorative (Edinger et al., 2004). According to the ICSD-2 definition insomnia diagnosis requires daytime dysfunction e.g. in mood and concentration related to the night time sleep difficulty. Moreover, primary insomnia (PI) is a subtype of insomnia that has a psychological basis (Lichstein, Wilson, & Johnson, 2000) and does not occur due to any other disorder (Riemann & Voderholzer, 2003). Essential for the PI according to the DSM-IV is at least 1 month duration of insomnia and/or subjectively experienced daytime impairments with unrefreshing sleep (APA, 1994; Riemann & Voderholzer, 2003). Lastly, secondary insomnia is caused by a psychiatric or medical disorder (APA, 1994; Lichstein et al., 2000).

The prevalence of insomnia varies depending on the definition (Morin, LeBlanc, Daley, Gregoire, & Merette, 2006). For example, approximately one-third of the general population presents at least one symptom criterion defined in DSM-IV (Ohayon, 2002). On the other hand, the prevalence of general insomnia disorder, including symptoms of distress or impairment, is from 10% to 15% in the adult population (Schutte-Rodin et al., 2008). Moreover, in the general population of Finland, insomnia symptomatology is reported by more than a third of Finnish participants (Ohayon & Partinen, 2002). The prevalence of any DSM-IV insomnia diagnosis in Finland is 11.7 %. When compared with European countries where research was carried out by using the same methodology, the prevalence of DSM-IV insomnia diagnosis is 1.5 times higher in Finland. These studies were conducted in France (Ohayon, 1997), the UK and Germany (Ohayon & Zulley, 2001) Spain and Portugal (Ohayon & Roth, 2001), and Italy (Ohayon & Smirne, 2002).

Insomnia is a widespread problem in the general population and affects many important area of life. Therefore, it is important to detect and treat sleep disturbances at an early stage (Ohayon, 2002). Unfavorable consequences include increased risk of depression and anxiety (Neckelmann, Mykletun, & Dahl, 2007; Riemann & Voderholzen, 2003), cognitive impairment (Shekleton, Rogers, & Rajaratnam, 2010), increased risk of accidents (Ohayon, Caulet, Philip, Guilleminault, & Priest, 1997), reduced

quality of life (LeBlanc et al., 2007), occupational difficulties (Sivertsen et al., 2009) and economic burden (Daley, Morin, LeBlanc, Grégoire, & Savard, 2009).

Several factors can initiate and maintain insomnia (Ohayon, 2002). Psychological (e.g. anxiety and depressive symptoms) and health-related variables are the most important risk factors related to new onset insomnia syndrome (LeBlanc et al., 2009). Negative life events are also related to new onset of insomnia syndrome. Numerous studies have shown that individuals with prior insomnia have an increased risk of psychiatric disorders (Ohayon, 2002; Ohayon, 1997). Therefore, the relationship between insomnia and psychiatric disorder appears to be bidirectional (LeBlanc et al., 2009; Ohayon, 2002).

Cognitive variables may play a critical role in the development and maintenance of insomnia (Morin, Blais, & Savard, 2002). Primary insomnia is presumed to be maintained by cognitive and behavioral mechanisms during the pre-sleep period and wakefulness involving dysfunctional attitudes and beliefs about sleep, intrusive thoughts and excessive and uncontrollable worry, hyperarousal and maladaptive sleep habits (Borkovec, 1982; Edinger & Means, 2005; Morin, 1993). According to the cognitive model of sleep, excessive negatively toned cognitive activity (e.g. worry and rumination) about sufficient amount of sleep and about the consequences of sleep disturbance trigger autonomic arousal and emotional distress (Harvey, 2002).

Surprisingly small amount of clinical attention is aimed towards the treatment of insomnia despite its prevalence (Morin & Wooten, 1996). Usually the recommended treatment is pharmacotherapy. Medication may be effective for a short term use but it may cause side effects and become chronic over the time (Endeshaw, 2001; Morin & Wooten, 1996; Ohayon & Caulet, 1996). Non-pharmacologic treatments for insomnia include stimulus-control therapy (Bootzin, Epstein, & Wood, 1991), relaxation therapy (Lichstein, 1988), sleep-restriction therapy (Spielman, Saskin, & Thorpy, 1987) and sleep hygiene education (Morin & Wooten, 1996; Passarella & Duong, 2008). These behavioral techniques aim to change maladaptive sleep habits, alter dysfunctional beliefs and attitudes about sleep and educate patients about more healthy sleep habits and reduce arousal (Morin & Wooten, 1996; Passarella & Duong, 2008).

Cognitive behavioral therapy (CBT) implements behavioral techniques mentioned above (Passarella & Duong, 2008). CBT for insomnia (CBT-I) is an empirically supported treatment that helps individuals with insomnia (Morin et al., 2006). Although CBT has clear therapeutic benefits, a maximally effective psychological treatment for persistent insomnia has not yet been developed

(Harvey & Tang, 2003). The effect sizes for CBT-I are moderate, but they are lower than reported effect sizes of CBT-I for other psychological disorders. CBT-I often includes a thought stopping component that resembles thought suppression (Harvey, 2003). According to Harvey this technique can intensify the suppressed thought and in fact worsen the efficacy of treatment for insomnia.

Acceptance and Commitment Therapy (ACT) (Hayes, Strosahl, & Wilson, 1999) is based on modern behavioral psychology and it utilizes acceptance and mindfulness-based processes, and commitment and behavior change processes. The core processes of ACT may be beneficial in the treatment of insomnia because of its emphasis on increasing experiential acceptance of internal psychological states (Dalrymple, Fiorentino, Politi, & Posner, 2010). Sleep is a physiological event that cannot be controlled. Thus, attempts to verbally regulate cognitive processes and to create strategies for falling asleep may be dysfunctional (Lundh, 2005). The presumed mechanism of change in ACT is psychological flexibility (Hayes et al., 1999) which may lead to beneficial treatment of insomnia (Dalrymple et al., 2010; Williams, 2010).

Theoretical framework of ACT is a contextual behavioral approach to human language and cognition: Relational Frame Theory (RTF) (Hayes, Barnes-Holmes, & Roche, 2001). The major goal of ACT is to increase psychological flexibility by utilizing six core processes (Hayes et al., 1999). These processes are named acceptance, cognitive fusion, being present, self as a context, values and committed action (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). The evidence suggest that ACT is beneficial in treating depression (Zettle & Rains, 1989), anxiety (Forman, Herbert, Moitra, Yeomans, & Geller, 2007), psychosis (Gaudio & Herbert, 2006) and chronic pain (McCracken, Vowles, & Eccleston, 2005). Furthermore, meta-analyses suggest the predominance of ACT over control conditions with medium to large effect sizes (Hayes et al., 2006; Öst, 2008).

Psychological flexibility is thought to be the mechanism of change in ACT which leads to favourable outcomes in a wide variety of populations and clinical symptoms (Ciarrochi, Bilich, & Godsell, 2010). Psychological flexibility refers to an individual's willingness to experience the present moment fully and consciously, and to the commitment to behavioral change or persistent in line with one's values (Hayes et al., 1999). From the ACT/RTF point of view psychological problems and human suffering emerge from language based processes (Hayes et al., 2006; Hayes et al., 1999). Suffering increases through psychological processes of experiential avoidance and cognitive fusion (Hayes et al., 1999; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Experiential avoidance occurs when one avoids experiencing certain private events (i.e., thoughts, emotions, bodily sensations,

memories) and attempts to alter the form, frequency, or situational sensitivity of those events, even when doing so leads to psychological harm and actions that are inconsistent with one's values and goals (Hayes, 2004; Hayes et al., 1996). A process that supports experiential avoidance is cognitive fusion (Hayes et al., 2006) which occurs when verbal processes (i.e. thoughts) are experienced indirectly and they regulate overt behavior inefficient ways. In other words, a person is unable to notice the process of thinking from the products of thinking (Hayes, 2004; Hayes et al., 2006).

Lundh and Broman's (2000) theoretical model describes two processes that are involved in the development and maintenance of insomnia by causing a "vicious cycle": firstly, sleep-interfering processes, such as arousal-producing pre-sleep worry and secondly, sleep-interpreting processes, such as dysfunctional beliefs, expectations and attributions about sleep. Furthermore, Lundh (2005) has suggested that by utilizing ACT and Mindfulness in the treatment of insomnia this cycle can be braked. Mindfulness refers to the ability to be highly aware of one's internal and external experiences and accepting the present state without judgment (Cardaciotto, Herbert, Forman, Moitra & Farrow, 2008). Sleep may be improved by decreasing cognitive regulation over sleep and increasing acceptance of the physical and mental experiences preceding sleep onset (Lundh, 2005). Moreover, Ong, Ulmer and Manber (2012) have proposed a meta-cognitive model of insomnia on the basis of the model by Lundh and Broman (2000). Observing accurately one's internal and external experiences may produce more flexible responses to sleep difficulties (Ong et al., 2012). This may lead to the ability to adopt less judgmental sleep-related beliefs and reduce dysfunctional arousal producing behaviors.

There have been a few studies with promising results to treat insomnia combining ACT with CBT (Dalrymple et al., 2010) and using ACT-inspired group treatment (Åkerlund, Bolanowski, & Lundh, 2005 cited by Lundh, 2005). ACT was utilized in a study by McCracken, Williams, and Tang (2011) and the results indicated that psychological flexibility correlated positively with sleep quality when treating participants with insomnia and chronic pain. Mindfulness, as an important part of ACT, has showed to predict sleep-related self-regulation and well-being (Howell, Digdon, & Buro, 2010). Furthermore, uncontrolled studies with promising results support the use of mindfulness-based approach for the treatment of insomnia (Bootzin & Stevens, 2005; Ong, Shapiro, & Manber, 2008, 2009; Ong & Sholtes, 2010). Furthermore, Ong and Sholtes (2010) suggest that mindfulness based approach might be more acceptable to patients who are looking for non-pharmacological treatments for insomnia and are willing to make changes in their lifestyle. When using Mindfulness-Based Stress

Reduction (MBSR) Del Re, Flückiger, Benjamin and Hoyt (2013) found that mindfulness practice quality can promote positive outcome.

Determining who actually benefits from the treatment is an important issue in psychotherapy (Jacobson, Roberts, Berns, & McGlinchey, 1999). In addition, Riemann & Perils (2009) have stated that there is a need to analyze data in terms of clinical relevance, such as percentages of responders and non-responders. In order to consider predictors of good outcome, a series of demographic and clinically relevant, potential explanatory variables have to be examined. There are no known studies on predictors of outcome in insomnia treated with ACT. Demographic variables have not been consistent predictors in earlier studies when treating insomnia with CBT (Espie, Inglis, & Harvey, 2001; Gagné & Morin, 2001). Older adults' response to treatment is comparable to that obtained with younger people, when they are screened for medical and other sleep disorders (Davies, Lacks, Storandt, & Bertelson, 1986; Friedman, Bliwise, Yesavage, & Salom, 1991; Morin, Kowatch, Barry, & Walton, 1993).

Only few relationships between therapy outcome and demographic factors have been established (Espie et al., 2001). For example, gender, occupational status or education does not indicate the outcome of therapy (Espie et al., 2001; Morin et al., 1994). Furthermore, marital status indicated poorer outcome only in enjoyment of sleep amongst those who live alone (Espie et al., 2001). Also, taking or not taking a hypnotic drug for sleeping problems cannot be associated with clinical outcome (Espie et al., 2001).

Previous research has failed to indicate a consistent relationship between the duration or severity of insomnia and the treatment outcome of CBT (Espie et al., 2001; Gagné & Morin, 2001). However, there is evidence that greater baseline sleep disturbance, higher baseline anxiety, depression and dysfunctional beliefs and worry about sleeping predicted a good outcome (Espie et al., 2001). A recent study of treating primary insomnia with CBT indicates that patients with pretreatment severe sleep disturbance, pronounced daytime impairments and low psychological wellbeing predicts improvements in sleep (Van Houdenhove, Buyse, Gabriëls, & Van den Bergh, 2011). In the study by Currie, Wilson, and Curran (2001) results suggest that low confidence managing one's sleep behavior before CBT based treatment predicted improvement with insomniacs secondary to chronic pain. Moreover, pretherapy cognitions also predict the outcome of CBT (Edinger, Carney, & Wohlgemuth, 2008). In addition, higher levels of unhelpful sleep-related beliefs, showed greater reduction in nocturnal wakefulness. Further, stronger beliefs in the negative long-term consequences of insomnia were related to good clinical outcome of CBT treatment in a study of Espie et al. (2001).

There are few studies examining whether pretreatment characteristics could reliably predict treatment response when treating other psychological problems with ACT. When treating patients with chronic pain, there were no significant characteristics that could predict treatment response significantly (Vowles, McCracken, & O'Brien, 2011). Experiential avoidance may be a potential moderator of ACT because it decreases willingness to experience private events (Hayes et al., 1999). Furthermore, willingness has been shown to mediate outcomes of ACT when treating people with anxiety disorders (Arch, Wolitzky-Taylor, Eifert, & Craske, 2012). In addition, Zettle (2003) found that participants with high pretreatment experiential avoidance benefited the most from ACT when treating experienced mathematics anxiety. Surprisingly, Wolitzky-Taylor, Arch, Rosenfield and Craske (2012) found that only moderate, but not high, baseline experiential avoidance lead to improvement when treating anxiety disorders with ACT. They also suggest that when compared to CBT, ACT is beneficial to those with baseline comorbid mood disorders.

In the study of Ovchinnikov (2011), individuals with higher perfectionism responded better to ACT when treating adults with anxiety disorders. Higher baseline neuroticism predicted poorer outcome when treating people with anxiety disorder with ACT (Wolitzky-Taylor et al., 2012). Numerous studies have shown that insomniacs are somewhat neurotic (Edinger, Stout, & Hoelscher, 1988; Lundh, Broman, & Hetta, 1995; van de Laar, Verbeek, Pevernagie, Aldenkamp, & Overeem, 2010; Wang, Zhu, Pan, Hu, & Wang, 2010), so this personality trait may moderate treatment outcome. Furthermore, An, Park, Jang, & Chung (2012) investigated how the insomniacs' temperament and characteristics correlate with the treatment outcome. The results indicated that reward dependence (e.g sensitivity to social rewards) was positively associated with the treatment response. Also, when predicting the outcome of behaviorally based treatments, greater improvement in sleep time was among subjects that were more rigid, traditional and conventional (Bliwise, Friedman, Nekich, & Yesavage, 1995). However, it is difficult to show causal relations between insomnia, personality traits and treatment response (van de Laar et al., 2010).

The aim of this study was to examine which pretreatment factors are related to good treatment outcome. It may be difficult to establish indications and contraindications of good outcome since there is a lack of research of consistent pretreatment variables that may affect to treatment outcome when using ACT as a treatment. However, there are individuals who do not respond to the treatment at all or show only partial response. Furthermore, since ACT is effective treatment for many problems (Öst, 2008), it is important to identify those who are most likely to respond because of the limited treatment

resources. In addition, identifying factors that may lead to better outcome can enhance our ability to match treatments and people who show a response. This may also reduce the economic burden caused by insomnia and shorten waiting periods to treatments since brief therapy can be offered. Lastly, it is important to examine the theoretical model of ACT and its effectiveness.

Because of the exploratory nature of this study, accurate hypotheses were not formed. This is the first known study examining pretreatment variables predicting ACT treatment outcome when treating people with insomnia. Demographic variables (e.g. age, gender and education), clinical variables related to insomnia (severity, duration and use of sleep medication), variables related to ACT processes (aspects of psychological flexibility), variables related to psychological problems and health related variables were examined as predictors of change. This study is based on treatment outcome study of Pelkonen and Puha (2013). Results of that study suggested that ACT is an effective treatment for insomnia; there were significant reduction in severity of insomnia and in dysfunctional beliefs and attitudes about sleep.

Methods

Subjects

The participants were acquired using two different methods. Firstly, an advertisement was placed in a local newspaper and secondly, by offering the chance to participate in the present study during a lecture for diabetics. Altogether 102 people applied for the study. Three criteria were to be met in order to participate in the present study. Firstly, insomnia symptoms had to be present at least six months. Secondly, to participate in the study, a participant had to fulfill at least one of the following three criteria: “Do you have difficulties falling asleep?”, “Do you have difficulties staying asleep?” and “Do you have problems waking up too early?”. Originally, the intervention was planned for 6-8 participants as an individual therapy. Since there were more applicants than anticipated, it would have been unethical to leave most of the applicants without treatment. Therefore, the intervention was revised into a group therapy. Due to this, the applicants were contacted again to make sure they were willing to participate in a group therapy instead of an individually organized intervention as originally planned.

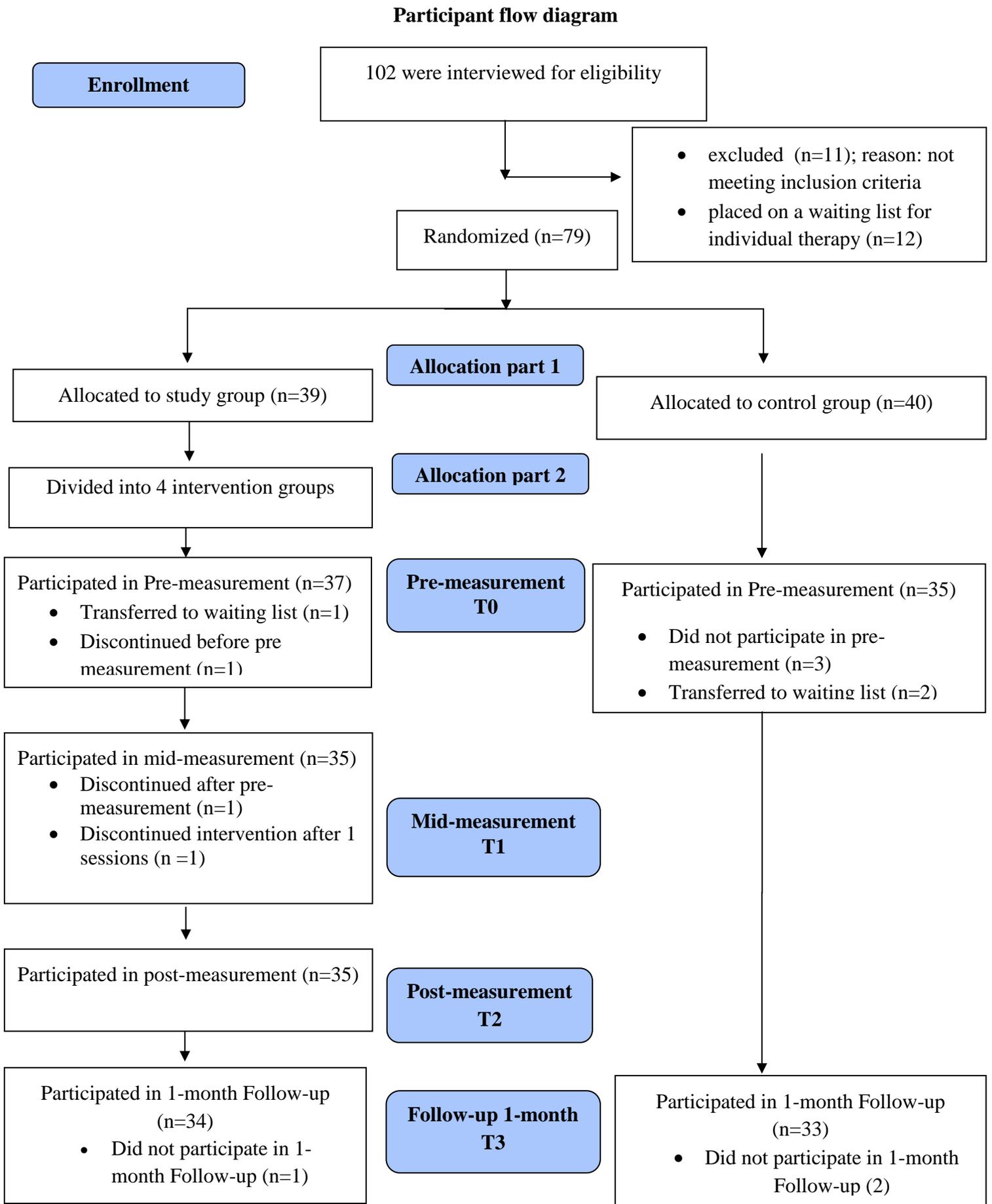
Finally, 12 participants declined from group intervention and they all wanted to be placed on a waiting list for individual therapy (Figure 1).

Applications were received via phone calls, during which background information was also collected. Based on the background information, participants who had other on-going therapies overlapping with the intervention were excluded from the study. In addition, applicants with a diagnosed mental illness, which could prevent the effects of the intervention, were excluded. However, depression or anxiety, whether diagnosed or not, were not excluding factors. Moreover, there was reason to believe that some applicants wanted to participate in the study for reasons other than sleep-related problems. For those seven applicants found to be unsuitable for the study, other available interventions were recommended. After examining the background information and informing the applicants about the change in the intervention structure, there were 79 participants left

Next, the 79 participants were randomized into two groups. First was the study group and consisted of 39 participants. Second was the control group and had 40 participants in it. Furthermore, four intervention groups of 9-10 people were formed within the study group. This was achieved by determining the therapy dates of each group and assigning people to different groups based on their own schedules. In addition, one of the control and the study groups were assigned to wear personal wellness managers (wrist worn accelerometers) (Mattila et al., 2008) during the waiting period and during the intervention. After the study group's waiting period was over the control group brought back the personal wellness managers. Data provided from wrist worn accelerometers is not discussed in this study.

From the 79 participants 76 took part in the information meeting during which pre-measurements were taken (Figure 1). After the pre-measurements 3 participants were transferred to the waiting list and one dropped out completely without even joining the waiting list for individual therapy. One participant discontinued after pre measurement and one after first session. From the 67 participants only 3 did not participate in the one month follow up. All in all, 34 participants from the study group took part to the intervention. Only 32 participants' data, though, was used in the statistical analysis, because two participants were excluded from the analysis due to absence from more than one of the 5 group sessions (Intervention section).

Figure 1. Participant flow diagram



The participants were a considerably heterogeneous group when considering background factors such as education, current work situation, age and gender (Table 1). Furthermore, the heterogeneity persisted through randomization so that both study and control groups had high heterogeneity. Women had slightly higher education level than men (77.4% versus 63.3%).

Scores of each personality trait of The Short Five Questionnaire (S5; presentation in “Measures” section) were divided into five categories that summarize data (Table 2). Also, means and standard deviations were derived from the summarized data. These categories were formed to provide more information about the participant’s personality on a group level. It is noteworthy though that the data regarding the S5 questionnaire in this study cannot be compared to studies based on the general population, since there are no previous studies where the above mentioned division has been used.

Study design

The study design was a randomized group intervention. The study group had a waiting period of 2 weeks and the control group had a waiting period of 4 months before entering the group therapy. The participants did not receive any non-pharmacological treatment for insomnia during the waiting period, thus, allowing comparisons about effectiveness of the intervention between study group and control group. The measurements took place in the following time points: Pre-measurement (T0), middle-measurement (T1), post-measurement (T2) and 1-month follow-up (T3) (Figure 1). The study group participated in each measurement whereas the control group only participated in measurements T0 and T3 which was the end of control groups waiting period. The study group was assigned to keep a sleep diary from one week before the first group session until a week after the last group session. Sleep diary is introduced in measures section. The control group was instructed to keep a sleep diary for the first week of the waiting period and during their intervention.

Table 1. Demographic information of the participants

Factor	Study group, n = 32	Control group, n = 31
Gender		
Female	21 (65.6)	18 (58.1)
Male	11 (34.4)	13 (41.9)
Age		
-Mean	54.25 (12.95)	54.58 (12.65)
-Range	28-78	26-77
Sleep medication		
-Yes	14 (43.8)	18 (58.1)
-No	18 (56.2)	13 (41.9)
In a relationship		
-Yes	27 (90.0)	24 (77.4)
-No	3 (10.0)	7 (22.6)
Current work situation		
Not working at the moment	3 (34.4)	6 (19.4)
Working	18 (56.2)	12 (38.7)
Retired	11 (34.4)	13 (41.9)
Education		
Vocational degree	7 (22.6)	6 (20)
University, polytechnic or college degree	24 (77.4)	19 (63.3)
No degree	0 (0)	5 (16.7)

Table 2. Frequencies and percent of participants' division into 5 categories based on their S5 total scores, n = 32

Personality trait	Frequency	Per cent
Neuroticism (M:2.59; SD: 0.80)		
1: from -36 to -24	3	9.3
2: from -23 to -11	10	31.3
3: from -10 to 10	16	50
4: from 11 to 22	3	9.4
5: from 23 to 36	0	0
Agreeableness (M:0.72; SD:4.00)		
1: from -36 to -24	0	0
2: from -23 to -11	0	0
3: from -10 to 10	8	25
4: from 11 to 22	16	50
5: from 23 to 36	8	25
Extroversion (M:3.34; SD: 0.75)		
1: from -36 to -24	0	0
2: from -23 to -11	2	6.3
3: from -10 to 10	20	62.5
4: from 11 to 22	7	21.9
5: from 23 to 36	3	9.4
Conscientiousness (M:3.66; SD:0.87)		
1: from -36 to -24	1	3.1
2: from -23 to -11	0	0
3: from -10 to 10	13	40.6
4: from 11 to 22	13	40.6
5: from 23 to 36	5	15.6
Openness (M: 3.75; SD: 0.88)		
1: from -36 to -24	0	0
2: from -23 to -11	2	6.3
3: from -10 to 10	11	34.4
4: from 11 to 22	12	37.5
5: from 23 to 36	7	21.9

Measures

Assessment of insomnia symptoms

Insomnia Severity Index (ISI)

Insomnia Severity Index is an instrument that is designed to assess the severity of insomnia targeting both nighttime and daytime components of it (Morin, 1993; Bastien, Vallières, & Morin, 2001; Morin, Belleville, Bédard, & Ivers, 2011). It consists of seven self-report questionnaires assessing the nature, severity, and impact of insomnia. Several dimensions are evaluated recalling last two weeks. The dimensions evaluated are: severity of sleep onset, sleep maintenance, and early morning awakening problems, sleep dissatisfaction, interference of sleep difficulties with daytime functioning, noticeability of sleep problems by others, and distress caused by the sleep difficulties. These dimensions are estimated on a 5-point Likert-scale yielding a total score ranging from 0 to 28 (Bastien et al., 2001). Higher ISI scores indicate more severe insomnia. Psychometric properties of ISI are considered valid and reliable (Bastien et al., 2001; Morin et al., 2011).

Basic Nordic Sleep Questionnaire (BNSQ)

The BNSQ has been widely used in a variety of studies carried out in Nordic countries during the last years, and it has proven to be a valid tool (Partinen & Gislason, 1995.) The BNSQ is a 25-item self-report measure developed to assess the quality of sleep, nocturnal sleep duration, sleep and waking time, daytime drowsiness and snoring. The main difference, when compared to previous questionnaires, is the five-point scale (scale from 1 to 5) which is used to indicate how frequent the symptoms are. The frequency is described accordingly: 1, 'never or less than once per month'; 2, 'less than once per week'; 3, 'on 1-2 nights per week'; 4, 'on 3-5 nights per week'; and 5, 'every night or almost every night'. Higher scores indicate poorer quality of sleep, fatigue, or more severe snoring and breathing interruptions.

Epworth Sleepiness Scale (ESS)

ESS is a simple, self-administered, eight-item questionnaire which is shown to provide a measurement of the subject's general level of daytime sleepiness (Johns, 1991.) Participants describe or estimate how they doze off inadvertently when engaged in activities involving low levels of stimulation, relatively immobile and relaxed (Fong, Ho, & Wing, 2005). ESS does not require any instrumental evaluation and therefore it is quick, inexpensive, flexible and able to measure chronic sleepiness.

Dysfunctional Beliefs and Attitudes about Sleep Scale (DBAS)

The brief version of Dysfunctional Beliefs and Attitudes about Sleep Scale is a 16-item self-report measure designed to identify and evaluate a subset of various sleep and insomnia-related cognitions (Morin, Vallières, & Ivers, 2007). The DBAS-16 identifies specific sleep-related beliefs and attitudes that separate individuals with insomnia from normal sleepers. The 16-item measure is scored on a 0–10 Likert-like scale (0 = Strongly Disagree; 10 = Strongly Agree). All items are structured so that higher scores connote more dysfunctional beliefs. The total score equals the sum of the individual item scores with a maximum score of 160.

Sleep Diary

Insomnia symptoms were assessed through by using a sleep diary, focusing on the previous sleep period (Appendix A). The sleep diary that was used in this study consists of 15 questions about the insomnia symptoms, the quality of sleep, how refreshed one feels after sleep and about the use of medication or alcohol in order to fall asleep. While keeping the sleep diary, participants evaluated their last night's sleep on a daily basis.

Assessment of psychological symptoms and personality

Beck depression Inventory (BDI)

In this study an immensely popular and upgraded version of the original Beck Depression Inventory, the BDI-II, was used to assess the severity of depressive symptoms throughout the past two weeks (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Beck, Steer, & Brown, 1996). The BDI-II is a 21-item questionnaire. Each item is rated on a 4-point Likert scale ranging from 0, indicating absence of symptoms, to 3, indicating the most severe symptoms. The total score is ranging from 0 to 63 and higher score indicates more severe depressive symptoms. The categorical ratings of depression are: minimal depression (0-13), mild depression (14-19), moderate depression (20-28), and severe depression (29-63).

Depression Anxiety Stress Scales (DASS)

The Depression Anxiety Stress Scales- questionnaire is used to measure a person's psychological symptoms (Lovibond & Lovibond, 1993; Lovibond & Lovibond, 1995). It has been confirmed that DASS distinguishes well between features of depression, physical arousal, and psychological tension and agitation in clinical and nonclinical groups (Antony, Bieling, Cox, Enns, & Swinson, 1998). This self-report questionnaire includes 42 questions about a person's negative emotional symptoms over the past week. DASS items are grouped into three scales: experienced feelings of depression (D), anxiety (A) and stress (S) (Lovibond & Lovibond, 1995; Brown, Chorpita, Korotitscw, & Barlow, 1996). Questions are answered on a 4-point Likert scale ranging from 0 to 3 (0 = Not holding true at all; 3 = Holding true a lot). Higher total score indicates more severe symptoms.

Symptom checklist 90 (SCL-90)

The Symptom Checklist-90-R (SCL-90-R) is one of the most widely used measures of multiple aspects of psychological distress in clinical practice and research (Derogatis, 1975). SCL-90-R includes 90 items rated on a 5-point Likert scale, ranging from 0 to 4 (0 = Not at all; 4 = Extremely). SCL-90-R measures dimensions of primary distress such as somatization, obsessive compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism. A Finnish validation of the SCL-90 was carried out by Holi, Sammallahti and Aalberg (1998).

The Short Five Questionnaire (S5)

A 60-item questionnaire, the 'Short Five' (S5), is designed for measuring personality with 30 facets of the Five-Factor Model identified by the NEO-PI-R (Costa & McCrae, 1992; Konstabel, Lönnqvist, Walkowitz, Konstabel, & Verkasalo, 2012). The items that are measuring each facet are positively or negatively toned comprising altogether twelve items per personality factor. S5 items consists of different descriptions about personality and are rated on 7-point scale ranging from -3 (the description is completely wrong) to 3 (the description is completely right). The major advantage of the S5 is that it allows a detailed description of personality traits (neuroticism, extraversion, openness, agreeableness and conscientiousness) with a relatively small number of items. According to Lönnqvist, Verkasalo and Leikas (2008) the Finnish S5 has convergent validity and good reliability with the NEO-PI-R.

The client's list of problems and difficulties

A self-reported problem list (Appendix B) was used to assess the client's problematic areas (e.g. anxiety, sleeping problems and health problems). The problem list consists of 28 items and each item is rated on a Likert scale from 0 to 10 (0 = Does not disturb at all; 10 = Disturbs a lot) illustrating how

disturbing the item is in one's life at the moment. The interpretation is based on the total score, which is calculated by combining all item scores together. Hence, higher total score indicates higher amount of problems either on few highly problematic areas or mediocre amount of problems on many areas.

Assessment of ACT processes

Acceptance & Action Questionnaire (AAQ-II)

A person's psychological inflexibility was measured with a widely used Acceptance & Action Questionnaire (Hayes et al., 2004; Bond et al., 2011). In this study a new version of the AAQ-II was used. The questionnaire estimates seven claims concerning acceptance and experiential avoidance on a 7-point Likert scale ranging from 1 to 7 (1 = Never true; 7 = Always true). A total score ranges from 7 to 49 and a higher score equals greater levels of psychological inflexibility.

Cognition Fusion Questionnaire (CFQ-13)

The CFQ is a 13-item self-reported questionnaire that measures cognitive fusion (Gillanders et al., 2010; Gillanders et al., 2013). It is a brief, reliable self-report measure of cognitive fusion and defusion as a general process. Items are estimated on a 7-point Likert scale labelled "never true" to "always true". Higher scores suggest more fusion in one's thoughts. CFQ focuses on generic thinking rather than specific content or type of thought. In addition to items of the believability of thoughts questionnaire has also items about literality, engagement with thoughts, perspective taking on thoughts, entanglement, struggle, and taking action in contrast to thinking. The CFQ shows high correlation and in predicted directions with measures of psychological inflexibility, mindfulness, rumination, distress, burnout and frequency of automatic thoughts (Gillanders et al., 2013).

Five Facet Mindfulness Questionnaire (FFMQ)

The FFMQ is a 39-item, self-report measure developed by Baer, Smith, Hopkins, Krietemeyer and Toney (2006). Participants rate how often they have a given experience using a 5- point Likert scale ranging from 1 to 5 (1 = Never or very rarely true; 5 = Very often or always true). It measures five factors of mindfulness: observing sensations, perceptions, thoughts, and feelings (O); describing with words (D); acting with awareness (A); non-judging of experience (NJ); and non-reactivity to inner experience (NR). The FFMQ is considered as a reliable and valid instrument (Bränström, Kvillemo, Brandberg, & Moskowitz, 2010).

The Adult Hope Scales (DHS and SHS)

The Adult Dispositional Hope Scale (DHS) is a self-report, 12-item inventory designed to measure one's dispositional hope in the age of 15 or older (Snyder et al., 1991). It consists of 8 hope items divided into two scales: 4-item Pathway component (goal-directed determination) and 4-item Agency (planning of ways to obtain the goals) component. Items are rated from 1 ('definitely false') to 8 ('definitely true'). There are also 4 filler items.

The Adult State Hope Scale (SHS) is used to measure a participant's hope at current level (Snyder et al., 1996.) The 6-item questionnaire includes 3 Pathway-items and 3 Agency-items that measure ongoing goal-directed thinking. Participants describe themselves in terms of how well they can solve problems, achieve goals and how well they think they have succeeded in life.

Sense of Coherence scale (SOC)

The Sense of Coherence (SOC) scale is used to evaluate an individual's inner strengths and orientation (Jacobson, 2011). Furthermore, the SOC scale explains successful coping with stressors (Antonovsky, 1979). In this study a 13-item SOC scale was used (Antonovsky, 1993). It consists of

three components: comprehensibility, manageability, and meaningfulness of one's life. Each item has been graded on a 7-point Likert scale. The grades of the items are summed up resulting in a total score ranging from 13 to 91. A higher total score indicates greater level of sense of coherence (Antonovsky, 1993). Furthermore, a strong sense of coherence can be associated with effective coping with life stressors (Jacobson, 2011). Lastly, higher levels of coherence can be associated with higher self-esteem, feeling of control in one's life and optimistic and positive mindset (Pallant & Lae, 2002).

Valued Living Questionnaire (VLQ)

Valued Living Questionnaire was developed as a tool for use in Acceptance and Commitment Therapy (Wilson, Sandoz, Kitchens, & Roberts, 2010). VLQ consists of two parts. Firstly, individuals evaluate the importance of 10 different areas of life (e.g., family, work, education, relationships). Secondly, the individuals are asked to rate how consistently they have been living according to the rated areas of life. Each item is rated on Likert-style scale from 1 to 10. Lastly, a Valued Living Composite is calculated using both importance and consistency. The valued living composite signifies the theoretical importance of individuals' values rather than the range or significance of one specific value.

Homework activity diary

The homework activity diary (Appendix C) was designed for monitoring weekly activity in mindfulness training, applying sleep hygiene instructions and actions committed to values outside therapy sessions. One's activity in mindfulness was self-evaluated by time (minutes) consumed in the activity per day. Evaluation of sleep hygiene was described in how instructions were applied. The actions committed to values -section was used to describe what sort of actions the participant took and how many days per week those actions were carried out.

Intervention

Acceptance and Commitment Therapy

The basis for the intervention was an ACT short individual therapy for depression. Thus, a clinical professor experienced in ACT revised the intervention into a short group therapy for insomniacs. This was achieved by directing the focus to specific exercises and themes that were linked especially with sleeping problems. The treatment consisted of six sessions from which the first one was held individually via phone. The remaining five group sessions were held weekly. Group sessions were always held on the same day of the week because of scheduling reasons, and clients were informed that they could skip one session. The individually held session lasted from 45 minutes to 90 minutes depending on the participant. However, the group sessions' took from 90 to 120 minutes. Group sessions durations were dictated by measurements and therefore sessions with measurements lasted close to 120 minutes. The intervention is more thoroughly described in the Master's Thesis of Puha and Pelkonen (2013).

Therapist

The intervention was carried out by a group of psychology students working in pairs. The pairs consisted of one master's degree student and one bachelor's degree student. The students received a short training course regarding the principles of ACT and they were given instructions for the revised ACT intervention. In addition, the therapists took part in the supervision of work and received mentoring from a neuropsychologist specialized in sleep. Moreover, the intervention was carefully structured in order to compensate for the lack of experience of the therapists. Furthermore, to ensure comparability between therapy groups, the therapists were given a DVD containing all the metaphors and exercises to be used in the intervention. The assignments given to the participants were predetermined in the revision of the intervention.

Statistical Methods

The data was first summarized to provide descriptive statistics. Subsequently, the participants were divided into groups of responders and non-responders in order to represent clinically significant improvement. In this study, it has been taken into account that as Kadzin (1977) and Jacobson et al. (1999) have pointed out regaining normal functioning may not always represent clinically significant improvement. Therefore, two outcome variables were used to estimate good and poor clinical outcome. Firstly, responders according to improvement in ISI scores (questionnaire measurement; ResISI) (11/32, 34.4%) had to have improved two standard deviations from the pre-measurement (T0) to the follow-up (T3) in their ISI-scores. Therefore, 65.6% (21/32) were non-responders. This determination of clinically significant improvement was based on the notions of Jacobson and Truax (1991), and the cut-off described above was used since there was a lack of normative data on ISI. The descriptive statistics regarding both groups are presented in Table 3.

Secondly, responders according to the difference in estimated sleeping time reported in the sleep diary (self-observation measurement; ResObs) (12/32, 37.5%) had to have improved in their self-evaluated duration of sleep for at least 30 minutes. Therefore, 62.5% (20/32) were non-responders. The self-evaluated duration of sleep was measured from the week after the last therapy session and it was compared to the week before group therapy. A minimum of 30-minute sleep disturbance (sleep onset and/or time awake after sleep onset; or last awakening before desired time) is considered as one of the markers of insomnia (Morin & Espie, 2003). Therefore, 30 minutes of estimated increase in sleeping time would provide an approximate clinical cut-off which represents improvement of insomnia. Furthermore, in the Master's Thesis of Pelkonen and Puha (2013) the same measure of self-evaluated duration of sleep was used. In the results self-evaluated sleep duration increased from 6.1 hours to 6.5 which was considered to be a significant ($p < .05$) change.

Table 3 Change in scores of ResISI and ResObs from Pre-measurement (T0) to 1-month Follow-up (T3)

Responders	Base of division	n	Mean	SD	Range
ResISI					
Responders	Decrease in ISI score	11	-12.3	2.4	-16 to -9
Nonresponders	Decrease in ISI score	21	-2.1	3.1	-7 to 3
ResObs					
Responders	Increase in sleeping time	12	1.3	0.5	2.3 to .5
Nonresponders	Increase in sleeping time	20	0.1	0.4	-1.1 to -.4

Responders according to decrease in Insomnia Severity Index scores (ResISI), Insomnia Severity Index (ISI), Responders according to increase in estimated sleep time (ResObs)

The difference between responders and non-responders was assessed in each possible predictor variable with One Way Analysis of Variance (ANOVA) at the pretreatment measurement point (T0). A p-value of $< .05$ was considered statistically significant. Effect sizes of statistically significant results were calculated in order to estimate impact. A Cohen's d value of .20 was considered as small impact, .50 as medium and .80 as large. Analyses were carried out using SPSS Statistics (version 20) and effect sizes were calculated by using Effect size calculators (Ellis, 2009).

The ANOVA results were verified by regression analysis. The method was simple linear regression model in which each possible predictor tested for a relationship with either the difference in estimated sleeping time (the basis for ResObs) or difference in ISI-scores (the basis for ResISI). Furthermore, a simple linear regression models, were a group of possible predictors of statistical significance, was used. A p-value of $< .05$ was considered statistically significant in simple linear regression.

Scores of each personality trait of S5 were divided into five categories that summarize the data. Categories are explained in Table 2. These categories were formed to provide more information about the participant's personality on a group level.

Results

Results of the outcome study of Pelkonen and Puha (2013) showed that there was significant interaction effect in ISI ($F_{1,61} = 7.80, p = .007, d = 0.50$) and in DBAS ($F_{1,61} = 9.32, p = .003, d = 0.79$). Furthermore, results from the sleep diary measurement point out that the increase in both total sleep time ($F_{1,31} = 9.22, p = .005$) and sleep quality ($F_{1,31} = 5.85, p = .022, d = 0.54$) were significant. In this study, certain items of the sleep diary from the week before first session were chosen for statistical analysis as possible predictors of outcome. Items included information about last night's amount of wake-ups, last night's duration of sleep in hours, last night's quality of sleep, sleep experience, vitality during daytime, homework activity and weekly sleep hygiene instructions compliance. Further participant's weekly mindfulness activity at home and weekly activity towards values (Values) were statistically analyzed as possible moderators of outcome.

After comparing the responders, both ResISI and ResObs, to the non-responders, no significant predetermining factors were found ($p < .05$). The comparison was carried out between 37 individual factors. Results of the factors that were not considered suggestive when ResISI was used included assessment of insomnia symptoms: ($F = 0.01 - 2.94, p > .10$), psychological symptoms and personality ($F = 0.01 - 1.71, p > .10$), ACT processes ($F = 0.00 - 1.72, p > .10$) and demographic measures ($F = 0.02 - 2.46, p > .10$). When ResObs was used as a criterion, non-suggestive factors were insomnia symptoms ($F = 0.10 - 2.34, p > .10$), psychological symptoms and personality ($F = 0.02 - 2.55, p > .10$), ACT processes ($F = 0.19 - 2.88$) and demographic measures ($F = 0.01 - 1.40, p > .10$).

The analysis indicated that statistically the difference between responders and non-responders of ResISI was suggestive ($p > .10$) when measured with ISI ($F_{1,30} = 2.94, p = .097, d = 0.49$), DHS ($F_{1,30} = 2.95, p = .096, d = 0.68$), DHS A ($F_{1,30} = 3.56, p = .069, d = 0.73$) and values ($F_{1,29} = 3.25, p = .082, d = 0.75$). When ResOBS was used as a variable, statistically the difference was suggestive with age ($F_{1,30} = 3.90, p = .057, d = -0.70$), DHS P ($F_{1,30} = 3.72, p = .063, d = -0.68$), SHS ($F_{1,30} = 3.39, p = 0.076, d = -0.65$) and DBAS ($F_{1,30} = 3.54, p = .070, d = -0.63$). Table 4 presents the summary results (mean and standard deviation).

Table 4. Means and standard deviations of suggestive ANOVA results

Predictor		n	Mean	SD
ResISI				
ISI	Nonresponder	21	17.48	3.2
	Responder	11	19.45	2.88
DHS	Nonresponder	21	33.76	7.44
	Responder	11	35.55	5.01
DHS A	Nonresponder	21	16.19	4.62
	Responder	11	17.36	4.92
Values	Nonresponder	21	3.57	1.32
	Responder	11	4.4	0.84
ResObs				
Age	Nonresponder	20	57.6	11.1
	Responder	12	48.67	14.34
DBAS	Nonresponder	20	101.6	13.24
	Responder	12	88.67	25.77
DHS P	Nonresponder	20	11.95	1.53
	Responder	12	10.75	1.96
SHS total	Nonresponder	20	36	5.8
	Responder	12	31.67	7.43

Responders according to decrease in Insomnia Severity Index scores (ResISI), Insomnia Severity Index (ISI), The Adult State Hope Scale (SHS), The Adult State Hope Scale Agency (SHS A), Weekly mean of days when participants committed activities towards values (Values), Responders according to increase in estimated sleep time (ResObs), Dysfunctional Beliefs About Sleep (DBAS), The Adult Dispositional Hope Scale (DHS), The Adult Dispositional Hope Scale Pathway (DHS P)

In contrast to the ANOVA results, simple linear regression analysis provided statistically significant relationships between the difference in improvement in ISI-scores and DHS total ($R^2 = .15$, $F_{1,30} = 5.38$, $p = .027$), DHS A ($R^2 = 1.89$, $F_{1,30} = 6.98$, $p = .013$) and Academic education ($p = 0.018$,

$R^2 = 0.15$) (Table 5.1). However, when trying to derive a model that would explain the change in the ISI-scores, none of the model combinations had statistical significance ($p > 0.05$). Furthermore, SHS total ($R^2 = .22$, $F_{1,29} = 4.53$, $p = .008$), SHS A ($R^2 = .24$, $F_{1,29} = 9.14$, $p = .005$) and AAQ-II ($R^2 = .13$, $F_{1,29} = 2.69$, $p = .045$) predicted statistically significant increase in self-evaluated sleep duration (Table 5.2). When SHS and SHS A were both in the model, the prediction was significant ($p = .020$), but R-Square was still .24. However, when SHS and AAQ-II were both in the model, AAQ-II was no longer a significant predictor ($p = .287$) and the R-Square for the model was .25.

Table 5.1. Regression analysis: Predicting decrease in ISI-scores

Variable	Mean	SD	Beta	R^2	p
Academic education	0.75	0.44	-0.42	0.17	0.018
DHS	23.31	3.03	-0.39	0.15	0.027
DHS A	11.81	1.65	-0.43	1.89	0.13

The Adult Dispositional Hope Scale (DHS), The Adult Dispositional Hope Scale Agency (DHS A)

Table 5.2. Regression analysis: Predicting increase in duration of sleep

Variable	Mean	SD	Beta	R^2	p
AAQ-II	17.55	8.41	0.36	0.13	0.045
SHS	34.35	6.8	-0.47	0.22	0.008
SHS A	16.55	4.75	-0.49	0.24	0.005

Acceptance & Action Questionnaire (AAQ II), The Adult State Hope Scale (SHS), The Adult State Hope Scale Agency (SHS A)

Discussion

The aim of this study was to define pretreatment factors that predict ACT treatment outcome when treating people with insomnia. Since there were no previous studies on the subject, several different variables were considered as possible predictors of treatment outcome. Participants formed a heterogeneous group of people that had ongoing difficulties with falling asleep, staying asleep and they

kept waking up during the night. The prevalence of insomnia is quite high: about one-third of the general population presents at least one of insomnia criteria defined by DSM-IV (Ohayon, 2002). Furthermore, in the general population of Finland insomnia symptomatology is reported by more than a third of Finnish participants (Ohayon & Partinen, 2002). Thus, it is essential to establish an effective treatment for insomnia and define the people who are most likely to benefit from the treatment. By doing so it would be easier to find proper treatment for people who show or do not show a response and shorten waiting periods to treatments. Furthermore, it may reduce the economic burden on society caused by insomnia.

A previous study conducted by using the same data suggests that ACT is an effective treatment for insomnia (Pelkonen & Puha, 2013). Still, in the present study, pretreatment factors that are related to improvement remain quite unclear. No significant pretreatment factors between responders and non-responders that were related to treatment outcome were found with ANOVA. However, there were some suggestive results. Responders according to improvement in insomnia severity had slightly higher insomnia severity, both lower overall dispositional hopefulness and dispositional hopefulness with agency thinking at pre-measurement (Table 4). Furthermore, they carried out slightly more actions committed to values. Responders according to the increase in self-evaluated duration of sleep were a bit younger, had fewer dysfunctional beliefs and attitudes about sleep, had lower pathway thinking of dispositional hope and lower current hopefulness at pre-measurement (Table 4). Furthermore, results from the linear regression analysis indicated that a slightly higher education level and lower pretreatment dispositional hope with agency thinking predicted milder insomnia severity at the 1-month follow-up in responders according to improvement in insomnia severity. Likewise, lower pretreatment hopefulness, especially agency thinking, and lower psychological flexibility predicted greater estimated sleep time the 1-month follow-up in responders according to improvement in their self-evaluated duration of sleep.

Since this study is the first to report pretreatment factors related to the outcome of ACT when treating people with insomnia, no accurate hypotheses were made. However, various pretreatment factors covering demographic factors, insomnia severity and symptoms, psychological symptoms, personality and psychological flexibility were considered as possible predictors of outcome.

It is challenging to interpret the results of the regression analysis because there are different factors behind the decrease in insomnia severity and increase in sleep duration. Psychological flexibility and current hope state seem to correlate with sleep duration whereas dispositional hope and

academic education seem to correlate with insomnia severity. Further studies are required in order to thoroughly explain this occurrence, but it might be that the measurement of insomnia severity based on a questionnaire and the increase in sleep duration based on self-observation capture in fact two different aspects of insomnia.

The results of this study regarding low pretreatment hopefulness are in contradiction with a previous study of pretreatment hopeful thinking and its relation to therapeutic change (Irving et al., 2004). Contradiction of this result is also seen in theoretical assumptions considering pretreatment positive expectations toward therapy and its relation to positive change (Snyder et al., 2000; Snyder, Irving & Anderson, 1991). It should be noted, that in the study of Pelkonen and Puha (2013) there were also significant interaction effect in both Adult State Hope Scale and Adult Dispositional Hope Scale. Thus, it could be said that the increase of hope and motivation relates to therapeutic change.

Altogether, interaction between hope and insomnia may suggest that those participants who were currently and dispositionally poorer initiating and maintaining actions that are necessary for reaching goals may have responded more easily to the treatment. It may be that the treatment has clarified one's values and increased actions committed toward those values and this has an indirect relation with sleep. Furthermore, suggestive results of ANOVA were more scattered when considering hopefulness (Table 4). It seems that responders with improvement in insomnia severity had slightly higher current hopefulness and agency at pre-measurement. In contrast, responders with increased self-evaluated sleep time had lower dispositional hopefulness and pathway thinking at pre-measurement. These results could reflect two different phenomena based on two different measures. The division of dimensions of hope in relation to insomnia and how processes of ACT interact with pretreatment hopefulness should be further examined. In particular, more accurate examination of pretreatment hope and its relation to insomnia could provide beneficial information.

Likewise, participants with poorer psychological flexibility may have benefitted from the processes of ACT since they aim to increase psychological flexibility. This may support the theoretical background of ACT, since it has been found that increased willingness may moderate the outcome (Arch et al., 2012). Furthermore moderate (Wolitzky-Taylor et al., 2012) and high (Zettle, 2003) baseline experiential avoidance are contributing responses to ACT -treatment. However, any conclusions cannot be made without further examination of these components. Moreover, it should be noted that there were no significant factors that could explain outcome, when participants were divided

into separate groups of responders and non-responders. This suggests that significant results are only approximate.

In addition, the education levels of responders and non-responders differed in the regression analysis results. Only one of the 12 responders did not have an academic education whereas seven non-responders out of 21 were not academically educated. However, the groups are rather homogenous and larger sample sizes are needed in order to establish a connection between education level and treatment outcome.

The non-significance of pretreatment factors when participants were divided into two groups suggests that people who suffer from insomnia at pretreatment level and responded to the treatment can display different aspects of psychological flexibility, mindfulness skills and cognitive defusion. However, there may be some factors that enhance the response to treatment.

Furthermore, some ANOVA results were suggestive. Firstly, responders with increased self-evaluated sleep time and non-responders varied in age. Furthermore, the responders that varied in age consisted of younger participants, although there was no statistically significant difference in means. Importantly, while 50 percent ($n = 6$) of responders were under 41 year olds, only 10 percent ($n = 2$) of non-responders were under 42 year olds. However, based on previous research, age alone does not seem to determinate therapy outcome in non-ACT treatments of insomnia (Cagné & Morin, 2001). Still, these findings might imply that younger participants benefit more from this type of ACT treatment. There might be various factors explaining this result. Mainly, one could argue that the sample size is rather small ($n = 32$). Also, effect size supports this claim since calculated strength of association, r , was only -0.30 which translates to barely medium effect size. Thus, age related conclusions considering therapy response cannot be made based on these findings alone.

Secondly, dysfunctional attitudes and beliefs (DBAS) were slightly lower in responders according to increased self-evaluated sleep time. This suggestive result is in contradiction with a study by Espie et al. (2001) which suggested that higher dysfunctional beliefs and worry about sleeping predicted a good outcome. However, in the study of Espie et al. (2001) CBT for insomnia (CBT-I) was used instead of ACT, hence the results are not fully comparable. Furthermore, the suggestive difference in Insomnia Severity Index (ISI) shown in ANOVA (Table 4) is rather small and, the significance of this suggestive result is very low. Therefore, the possible significance of Insomnia Severity Index as a predictor of treatment outcome needs further investigation.

Thirdly, the amount of actions committed to values per week seems to suggestively relate to outcome. Responders spent on an average 4.4 days per week doing actions committed to values, whereas non-responders spent 3.57 days per week. The difference is not major, but it suggests that clarifying and acting towards values may have eased the participants' everyday problems that are possibly causing stress and interference related to sleep.

The non-significance of predictive value of ACT processes (i.e AAQ-II, FFMQ and CFQ-13) between responders and non-responders analyzed with ANOVA were interesting since previous studies suggest that higher mindfulness is associated with better sleep quality and well-being among healthy individuals (Howell et al., 2010; Howell, Digdon, Buro, & Sheptycki, 2008). Furthermore, Lundh (2005) has proposed that ACT may be beneficial in the treatment of insomnia since it facilitates cognitive deactivation by contributing non-judgmental observation of naturally occurring physical and psychological processes. Therefore, one could argue that pretreatment psychological flexibility moderates the outcome. However, the linear regression analysis showed that pretreatment psychological flexibility was negatively associated with greater amount of sleep. This association does not prove clinical improvement, since it does not predict the response, but it should be taken into account in further studies.

Based on the relationship between sleep and psychological flexibility observed in this study, it could be said that good pretreatment psychological flexibility does not guarantee clinical response to the treatment. On the other hand, this conflict may exist due to lack of research in the area of treating insomnia with ACT and complexity of the interaction of insomnia and psychological flexibility. This interaction may be indirect since ACT is focusing on change of behavior and quality of action which may not lead direct changes in sleep and psychological flexibility. It is a process that may be time consuming but eventually lead to better sleep and psychological flexibility.

Lastly, personality traits did not predict response to treatment when considering the participants' personality on a group level. Certain conclusions, though, could be drawn. However, these conclusions cannot be generalized in relation to the general population since there is no S5 data collected from people who represent general population. Firstly, the participants were rather agreeable, since 50 % could be placed in class 4 (16/32) and 25 % in class 5 (8/32). This result suggests that participants were more likeable, pleasant, and harmonious in relations with others (Graziano, Tobin & Leary, 2009). This may explain why they were more accepting towards the group intervention as a therapy form. Secondly, the participants may have been more open, since 37.5 % were placed in class 4

(12/32) and 21.9 % in class 5 (7/32). Lastly, it can be said that the participants were also quite conscientious since 37.5 % were in class 4 (12/32) and 15.6 % (5/32) were in class 5. Based on these notions, it is possible that the personality traits of the intervention group represent more characteristics of people who are willing to participate in group therapy than people who suffer from insomnia. Furthermore, results of S5 may represent people who volunteer in study, since it has been shown, that this type consistently gets higher scores on extraversion, agreeableness and conscientiousness and lower scores in neuroticism (Lönqvist et al., 2007). These results should be further examined in the future.

Several factors can be seen as limitations of the study. Firstly, all questionnaires used in the study were based on self-evaluation. Therefore, the reliability of the data relies solely on the assumption that the participants were able to evaluate their situation properly. Clearly, this is not always possible and, hence, more objective measurements for determining the predictors of the therapy outcome and the severity of insomnia are required to gain more reliable data. Previous studies have shown that insomnia sufferers have greater tendency to underestimate their total sleep time and overestimate the time they spend awake (Carskadon et al., 1976; Edinger & Fins, 1995; Means, Edinger, Glenn, & Fins, 2003). It may be that the interaction between sleep and ACT processes is more complicated than the chosen measures were able to reveal and need further investigation. Furthermore, the lack of research of ACT for insomnia limited the number of available questionnaires. Thus, there is a need for new questionnaires that combine insomnia and various aspects of ACT, especially psychological flexibility. For example, there is no insomnia version of the AAQ-II.

Secondly, it was problematic to define the participants who benefited from those who did not and to form a criterion that could reliably separate the two groups. Moreover, there are several statistical methods of calculating individual change, but not yet clear consensus regarding the best method (Currie et al., 2001). Therefore, dividing the study's sample group into two distinctive categories may be unnatural since better sleep and insomnia are not a dichotomous phenomenon, but rather lie on a continuum. Thus, depending on few self-report questionnaires to define an improvement regarding insomnia can be criticized since it ignores a naturally occurring variation within the groups of responders and non-responders. Furthermore, separation of two groups with different treatment response characterized by better sleep ignores other factors that may reflect the good outcome and eventually lead to better sleep, namely, improved quality of life, adoption of a new stance and psychological flexibility.

Thirdly, there can also be a tendency to over interpret group differences in order to confirm hypotheses although clients are not satisfied (Jacobson et al., 1999). It should be noted, that the clinical significance is commonly defined as returning to normal functioning (Jacobson et al., 1999), but in this study, improvement is rather seen as an amount of change in each participant. In addition, Jacobson and Truax (1991) have noted that applying two standard deviation cut-offs will not provide the most exact estimation about how close participants are to the well-functioning population. Lastly, the lack of group that represents good sleepers can be seen as a limitation since it could have given material to compare the clinical improvement.

As a further limitation, factors regarding the study design and sample size could be seen as limitations of the study. To begin, the study group consisted of only 32 participants. Furthermore, after determining the criteria for the responders, only 11-12 participants were defined as responders. Moreover, the study was conducted by four different pairs of therapists. It can be expected, that whereas the intervention itself was well structured to increase the comparability between the intervention groups, the therapists may have differed in their approach. Also, expectations towards therapy were not canvassed, even though they might be one factor predicting therapy outcome. It has been found that client's expectations for group therapy, including anxieties and reservations, influence interpersonal behaviors in the group and willingness to participate in the group therapy (Corazzini & Hepner, 1982; Yalom, 1995). Furthermore, ACT is a rather new form of psychotherapy and it presents a new way of thinking that may differ from what people expect from psychotherapy. ACT concentrates on altering the context of thoughts, not the form, and it does not give straight answers for how to sleep better. If expectations towards the therapy or the therapist are unrealistic (e.g participant expects to sleep much better after treatment) it may lead to disappointment and alter the therapy outcome. Consequently, further studies including expectations towards therapy as well as attitude towards therapists are needed to determine their possible role in the therapy outcome.

In addition, group dynamics can be related to treatment outcome. Treatment groups consisted of heterogeneous participants with a wide range of problems in addition to insomnia. Also, treatment groups were very heterogeneous when considering demographic factors. Thus, conversations in pairs and within the whole group might have felt artificial. Therefore, some members of the group might have benefitted more from individual therapy since group treatment may limit the possibility to talk about one's individual problems sufficiently. However, there was just one member who dropped out from the treatment groups suggesting that the cohesion in the groups was rather good based on

previous studies examining drop outs (Falloon, 1981; Yüksel, Kulaksizoglu, Tuerksoy, & Sahin, 2000). Nevertheless, since the treatment resources are limited, it would be beneficial to determine which characteristics help individuals to thrive in group therapy. Thus, further study addressing group dynamics could prove to be useful. In addition, future studies could look into the participants' attitudes towards the group, because it could be another possible predictor of successful therapy.

Lastly, the intervention used in this study was designed to follow a very strict schedule. Due to this, the lack of personalized homework assignments might explain the amount of time and effort put into homework, hence influencing one's motivation towards the intervention. Thus, it could be suggested that the structure of the intervention should be altered so that homework could be more personalized to increase motivation towards exercises. Moreover, some of the participants of the present study seemed to understand the concepts of ACT, including metaphors and exercises, on a very concrete level. Therefore, personalized homework could help the participants to understand the concepts of ACT better and, thus, increasing the motivation towards the intervention and helping to ensure the success of the therapy. Furthermore, adding an individual session in the midst of the intervention might help to revisit and clarify some concepts of ACT that may have been misunderstood or undervalued by clients. In addition, regular checking of homework and peer pressure may play an important role in some individuals' decision making and motivation to practice the given exercises. Lastly, measuring the participants' motivation with questionnaires could help in determining whether motivation affects therapy outcome or not.

However, being the first study to attempt to clarify factors that predict successful therapy outcome, it can be said that some clarity was certainly achieved. The analysis was carried out using two different methods in which both a rather vast amount of possible predicting factors was processed. Also, it was found out that none of the possible predictors actually predicted therapy outcome. Moreover, even though the present study had a rather small sample size further studies can now focus on more exclusive research questions. Admittedly, further studies focusing on challenging, and possibly verifying, the results of the present study, are needed. Also, due to the small sample size and all the limitations of the study, the results of this study cannot be generalized without further confirmation.

Since no factors that significantly separated the groups were found in the present study, it could be that motivation towards the intervention is an indicator of success of the intervention. Thus, motivation towards the intervention should be addressed in the further studies. However, motivation is

difficult to measure and it wasn't directly considered as a predicting factor in this study. Still, the results and the structure of this study brought up some factors that further studies could consider.

Conclusions

To conclude, the aim of the study was to find out whether certain factors can predict therapy outcome on insomniacs participating in acceptance and commitment group therapy. No such predictors were found between responders and non-responders, so it can be said that according to the present study, acceptance and commitment therapy as a group therapy can be helpful to a heterogeneous group of people suffering from insomnia. However, the results suggest that without the group division into responders and non-responders, the lower pretreatment dispositional hopefulness before therapy and academic education predicted greater reduction of insomnia severity. Similarly, lower current hopefulness and lower psychological flexibility before therapy predicted increase in estimated sleep at 1-month follow up after therapy. These results should be taken into account in further studies. Altogether, the field of possible predictors is now somewhat more narrow and possibly better focused. However, the present study had many limitations and, therefore, further studies need to be carried out before any generalizations can be made. Further studies should consider on developing specific measurements that focus on the interaction of sleep and psychological flexibility (e.g AAQ-II with insomnia). Furthermore, assessing the participants' overall hopefulness, attitudes towards therapy and the therapist, motivation towards therapy and group dynamics could be beneficial. Altogether, group therapy is cost-effective and acceptance and commitment therapy -procedure rather easy to acquire regardless of lack of experience of the therapist.

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Appendix A

Unipäiväkirja

Aloituspäivämäärä _____

Täytä lomake aamuisin puolen tunnin kuluessa heräämisestä

		ma	ti	ke	to	pe	la	su
1	Nukuin eilen päiväunet klo: ___ - ___							
2	Otin eilen nukahtamislääkettä, määrä ___ mg							
3	Nautin eilen alkoholia nukahtamiseen, määrä ___ (annosta)							
4	Menin vuoteeseen ja sammutin valot klo...							
5	Olin vuoteessa hereillä noin ___ min ennen nukahtamista							
6	Heräsin viime yön aikana ___ kertaa							
7	Heräämisten yhteydessä valvoin noin ___ minuuttia							
8	Tänä aamuna heräsin klo...							
9	Nousin vuoteesta klo...							
10	Arvioni mukaan nukuin viime yönä noin ___ tuntia ___ min							
11	Noustessani tunsin itseni... (1= todella väsyneeksi..5= hyvin virkeä)							
12	Nukkuminen viime yönä oli laadultaan... (1=erittäin levotonta...5= erittäin rauhallista)							
13	Kokemukseni viime yöstä oli... (1=erittäin ahdistava... 5= erittäin levollinen)							
14	Tunsin itseni eilen pääasiassa... (1=erittäin väsyneeksi...5=erittäin tarmokkaaksi)							
15	Tunsin itseni eilen pääasiassa... (1=erittäin rentoutuneeksi...5=erittäin jännittyneeksi)							

Huomioita:

Ma:

Ti:

Ke:

To:

Pe:

La:

Su:

Appendix B

Kotitehtävät:

Aikajakso: _____

Henkilö (numero): _____

Ohjelmassa annetaan tapaamisen jälkeen kotitehtäviä. Merkitse rastilla (x) jokaiselta päivältä (esim. illalla), jos olet tehnyt lomakkeessa mainittuja asioita. Kuvaa miten ja Mitä. Kirjoita tekemisiäsi huomioita vapaaseen tilaan taulukon alle. Ota lomake mukaasi seuraavalle tapaamiskerralle.

Pv	Tietoisuustaito- harjoitus =(x)	Soveltanut nukkumisongelmaan annettuja ohjeita =(x).	Tehnyt arvojen mukaisia tekoja =(x)
1	()Aika*:	()Miten?	()Mitä?
2	()Aika:	()Miten?	()Mitä?
3	()Aika:	()Miten?	()Mitä?
4	()Aika:	()Miten?	()Mitä?
5	()Aika:	()Miten?	()Mitä?
6	()Aika:	()Miten?	()Mitä?
7	()Aika:	()Miten?	()Mitä?

*Harjoituksiin käytetty aika yhteensä.

Appendix C

KH _____
PVM _____

ONGELMALUETTELO

Valitse alla olevasta luettelosta ne asiat, jotka koet ongelmiksesi tällä hetkellä ja arvioi ongelman viereen **asteikolla nollasta kymmeneen**, kuinka paljon tämä asia vaivaa sinua **tällä hetkellä** tai kuinka suuri ongelma on.

Käytä asteikkoa **0-10**, jossa:

10 = vaivaa hyvin paljon

1 = vaivaa hyvin vähän

0 = ei yhtään, ei ongelmia

- Adistuneisuus
- Masentuneisuus ja alakuloisuus
- Työuupumus
- Väsymys
- Jaksamattomuus
- Nukkumisongelmia
- Parisuhdeongelmia
- Ihmissuhdeongelmia työpaikalla
- Muita ihmissuhdeongelmia
- Painonhallintaan liittyviä ongelmia
- Muita syömishäiriöitä
- Terveysteen liittyviä ongelmia
- Huono fyysinen kunto
- Rahahuolia
- Huolia omaisten terveydestä ja voinnista
- Huolia lasten terveydestä ja voinnista
- Lastenkasvatusongelmia
- Jatkuva kiire
- Liiallinen työmäärä
- Pelkoja
- Paniikkihäiriöt ja -kohtaukset
- Sosiaalisten tilanteiden pelko ja vaikeus liikkua ihmisten parissa
- Murehtiminen
- Alkoholin liiallinen käyttö
- Liiallinen tarve tarkistaa asioita
- Häiritsevät tai pakkoajatukset
- Peliriippuvuus
- Liiallinen tietokoneen tai internetin käyttö

Muuta ?
