Bachelor Thesis

‘Do Sleep Disturbances Indirectly Affect the Relationship Between Experiential Avoidance and Depression?’

Susanne Lina Katharina Völler
s1564544

Study Programme: Psychology
Specialization: Positive Psychology and Technology
1st Supervision: dr. Llewellyn E. van Zyl
2nd Supervision: dr. Peter A. M. Meulenbeek

16th June 2017

UNIVERSITY OF TWENTE.

Abstract Dutch

Oriëntatie: Experiëntele vermijding is een onaangepaste coping strategie omdat het depressie oproept. Vervolgens is het belangrijk het werkingsmechanisme van experiëntele vermijding te achterhalen. In deze studie wordt de cognitieve bias van ruminatie geanalyseerd. Het is bekend dat individuen over negatieve ervaringen rumineren welke derhalve de gedachten domineren. Ook tijdens slaap verwerken individuen deze negatieve ervaringen. Dit kan tot slaap problemen leiden.

Onderzoeksdoel: Het doel van deze studie is het bepalen van de indirecte effect van slaap problemen op de relatie tussen experiëntele vermijding en depressie.

Motivatie voor de studie: Omdat depressie het leven van een individu negatief beïvloed en een sociale last representeert is de preventie van het opkomen van depressie door het ontdekken van mogelijke oorzaken noodzakelijk.

Onderzoeksdesgin: Een cross-sectionele enquête-gebaseerde onderzoeksdesign wordt gebruikt en een conveniënt sneeuwbal sample (n = 113). Vier vragenlijsten over biografisch achtergrond, experiëntele vermijding, slaap problemen en depressie worden toegediend.

Hoofdresultaten: Het wordt duidelijk dat experiëntele vermijidng, slaap problemen en depressie positief correleren. Experiëntele vermijding voorspelt slaap problemen en depressie. Daarnaast voorspellen slaap problemen depressie. Echter, wordt er geen indirecte effect van slaap problemen op de relatie tussen experiëntele vermijding en depressie gevonden.

Praktische implicaties: De variabele slaap problemen moet verder gedefinieerd worden. Het is onbekend of slap een bewuste of onbewuste toestand is. Daarom is het moeilijk het effect op denkprocessen te bepalen.

Bijdrage: De resultaten geven inzicht in de relatie tussen experiëntele vermijding, slap problemen en depressie, en draagt bij aan de wetenschappelijke kennis over de mogelijke oorzaken van depressie.

Sleutelwoorden: Experiëntele Vermijding, Slaap problemen, Depressie

Abstract English

Orientation: Experiential avoidance is a maladaptive coping strategy as it evokes depression. Therefore, it is meaningful to study the working mechanism of experiential avoidance. In this study, the cognitive bias of rumination is analysed. It is stated that individuals ruminate about avoided negative experiences, which consequently dominate the mind. While sleeping individuals proceed these aversive experiences as well which can further result in sleep disturbances.

Research Purpose: The aim of this study is to determine the indirect effect of sleep disturbances on the relationship between experiential avoidance and depression.

Motivation: As depression stresses an individual's life and represents a societal burden, the prevention of its onset by exploring possible causes is needed.

Research Design: A cross-sectional survey-based research design was used with a convenient snowball sample (n = 113). Four questionnaires about biographic background, experiential avoidance, sleep disturbances, and depression were administered.

Main findings: Experiential avoidance, sleep disturbances, and depression were found to have a positive correlation. Experiential avoidance predicts sleep disturbances and depression. Furthermore, sleep disturbances predict depression. However, no indirect effect of sleep disturbances on the relationship between experiential avoidance and depression could be found.

Practical implications: The variable sleep disturbances needs to be defined in more detail. It is still unknown whether sleep is a conscious or unconscious state. Hence, it is difficult to determine their effect on thinking about experiences.

Contribution: The results give insight into the relationship between experiential avoidance, sleep disturbances and depression, and contribute to the scientific knowledge about the causes for depression.

Keywords: Experiential Avoidance, Sleep disturbances, Depression

Content

Introduction

A critical risk factor for the development of psychopathology is given by experiential avoidance (Chawla, & Ostafin, 2007; Hayes, Luoma, Bond, Masuda, & Lillis, 2005; Pickett, & Kurby, 2010). Experiential avoidance is a maladaptive coping strategy by which individuals avoid negative and aversive experiences (Chapman, Gratz, & Brown, 2005). However, these experiences dominate the mind as they are ruminated more often. The cognitive bias of rumination is an underlying working mechanism of experiential avoidance (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Pickett, & Kurby, 2010). According to Thompson (2015), this cognitive bias also occurs in the state of sleep, since past experiences can re-occur within dreams (Chokroverty, 2010). This phenomena can result in sleep disturbances as it is distressing and can also impair daily life (Spoormarker, 2008). Further, sleep disturbances are a core symptom of depression (Sivertsen, Harvey, Lundervold, & Hysing, 2014) which is a psychological disorder that affects the mental and physical functions of an individual (Davey, 2014). Therefore, depressive individuals can have difficulties to fulfil their role in society (Anxiety and Depression Association of America, 2017). Greenberg (2015) supposes that the societal burden in consequence of depression is constantly rising and costs the American society about $210 billion per year (Greenberg, 2015). To improve the lives of depressive individuals and, following, the society it is essential to specify the causes of depression (Greenberg, 2015).

Previous studies demonstrated a significant relationship between experiential avoidance and depression (Chapman et al., 2005; Chawla, & Ostafin, 2007; Hayes et al., 2005; Pickett, & Kurby, 2010). However, Pickett and Kurby (2010) state that the underlying mechanisms of this relationship are still unspecified. Within the present study the indirect effect of sleep disturbances are explored. Therefore, experiential avoidance is considered as the independent variable, sleep disturbances as the mediator and depression as the dependent variable.

Experiential Avoidance

The act of avoidance is common (Chawla, & Ostafin, 2007). From time to time individuals are confronted with problems or challenging events, like an unpleasant dispute with a friend or a failed presentation. These problems can evoke negative internal experiences, like uncomfortable feelings, emotions, thoughts or memories (Chapman et al., 2005). It is an innate human tendency to avoid or forget negative experiences (Van Zyl, & Rothmann, 2014). In moderation, avoidance is appropriate and functional, because it elicits

relief and self-preservation (Hicks, & Routledge, 2013). However, in a more serious context avoidance can be harmful. When experiences are characterised as strongly negative and threatening they lead to distress (Bardeen, & Fergus, 2016; Chapman et al., 2005; Pickett, & Kurby, 2010). To reduce the experience of distress, individuals could activate dysfunctional coping strategies such as experiential avoidance (Chapman et al., 2005). Experiential avoidance includes the attempt to avoid negative experiences and their associated external events (Chapman et al., 2005). It is intended to reduce the intensity and frequency of these experiences and events (Hayes et al., 2013). Therefore, the aim of experiential avoidance is self-defence (Pickett, & Kurby, 2010). However, research suggests that this strategy is ineffective, dysfunctional and harmful as it can evoke depression (Bond, Hayes, Baer, Carpenter, Guenole, Orcutt, Waltz, & Zettle, in press; Chapman et al., 2005; Pickett, & Kurby, 2010). To clarify how experiential avoidance can cause depression, this paper first reviews experiential avoidance as an independent risk factor in more detail.

Experiential avoidance involves two related components: avoidance and escape (Pickett, & Kurby, 2010). Avoidance is described as the unwillingness to endure aversive experiences and events. Escape, however, is defined as an intentional act to change or minimize the re-occurrence of these experiences (Chawla, & Ostafin, 2007; Pickett & Kurby, 2010). To meet these components experiential avoidance encompasses different behavioural and cognitive strategies (Bardeen, & Fergus, 2016; Chawla, & Ostafin, 2007; Pickett, & Kurby, 2010).

The behavioural strategies include substance abuse, like alcohol or drug use, and the actual avoidance of feared external conditions (Chapman et al., 2005; Chawla, & Ostafin, 2007; Pickett, & Kurby, 2010). Individuals try not to visit objects, places or people which they fear, for example, they disregard the friend they had a dispute with. The cognitive strategies contain the suppression of thoughts and emotions where individuals try to escape from (Chapman et al., 2005; Hayes et al., 2005; Pickett, & Kurby, 2010). Individuals try to escape from uncomfortable feelings by controlling their own negative thoughts and emotions (Chapman et al., 2005). When experiencing stress individuals inhibit the directly occurring negative feelings by suppressing these feelings or distracting themselves. For example, they watch a trivial movie instead of confronting the friend causing discomfort, distress or fear (Nolen-Hoeksema et al., 2008). These strategies can generally reduce the internal experiences of discomfort and distress in the short term (Bardeen, & Fergus, 2016; Hayes, Levin, Plumg-Vilardaga, Villatte, & Pistorello, 2013). However, in the long term experiential avoidance ineffective and maladaptive (Hayes et al., 2013), because it leads to a more intense and stable

encoding of the aversive experience in the long-term memory (Saccet, Levy, Hamilton, Maksimovskiy, Hertel, Joormann, Anderson, Wagner, & Gotlib, 2017).

The encoding of aversive experiences occurs in verbal and cognitive processes (Hayes et al., 2013). Hence, these processes are the underlying basis of experiential avoidance. According to Hayes et al. (2013) verbal and cognitive processes are characterised by a relational nature since individuals can create a network of associations. Following, the aversive experiences can be related to verbal manifestations and scripts. These make it possible to evaluate, discuss, or avoid the experiences (Hayes et al., 2013). However, the attempt to verbally avoid an experience actually includes the target experience as an independent script: "*I should not think about this experience*" (Chawla, & Ostafin, 2007; Pickett, & Kurby, 2010). Therefore, the intended avoidance leads to the re-occurrence of that event in the mind which increases its functional importance (Hayes et al., 2005; Hayes et al., 2013). The aversive experience becomes more accessible and salient (Chawla, & Ostafin, 2007). Furthermore, external events and stimuli that elicit the experience can get enhanced (Chawla, & Ostafin, 2007). These associations represent further opportunities that can evoke the re-occurrence of the aversive experience (Hayes et al., 2005; Pickett, & Kurby, 2010) which consequently has a higher possibility to be re-experienced (Chawla, & Ostafin, 2007). Generally, the negative experiences take a greater role in the brain (Hayes et al., 2013) and all related thoughts are strongly encoded in the long-term memory (Saccet et al., 2017). Therefore, experiential avoidance leads to an intensification of the aversive thoughts about an experience (Pickett, & Kurby, 2010). As such, the aim of reducing negative thoughts results in more negativity leading to an internal paradox (Hayes et al., 2005).

This paradox can be explained by cognitive bias (Pickett, & Kurby, 2010). All sources that can lead to the re-experience of an aversive event need to be controlled by the verbal and cognitive processes (Hayes et al., 2013). Individuals with a high intensity of experiential avoidance show cognitive vulnerability (Pickett, & Kurby, 2010). In overextended situations they might feel entangled within the aversive experiences of the past (Hayes et al., 2013). These aversive experiences dominate the individual's thoughts so that the attentional focus gets limited (Hayes et al., 2013). Therefore, it can be difficult to verbally regulate and exclude sources that evoke the re-experience. Consequently, the re-experience of the negative thoughts can occur more frequently and intensively than before. This repetitive fixation on negative thoughts is named rumination (Hayes et al., 2013; Nolen-Hoeksema et al., 2008).

The cognitive bias of rumination can cause psychopathology (Nolen-Hoeksema et al., 2008). Over time the negative thoughts define an individual's attitude and can lead to higher

cognitive distress and cognitive disabilities (Nolen-Hoeksema et al., 2008). First, rumination results in difficulties with problem solving (Chapman et al., 2005; Hayes et al., 2013; Nolen-Hoeksema et al., 2008), because negative and pessimistic attitudes makes individuals feel insecure (Nolen-Hoeksema et al., 2008). Problems were experienced as overwhelming and seem to be unsolvable (Hayes et al., 2013; Nolen-Hoeksema et al., 2008). Hence, the problems require a larger part of the mind as individuals rethink them more often (Nolen-Hoeksema et al., 2008), even though they feel so overloaded that they cannot act efficiently (Nolen-Hoeksema et al., 2008). The problems persist and make the individuals feel an increase of distress and a decrease of self-confidence at once (Nolen-Hoeksema et al., 2008).

Second, rumination leads to an inhibition of instrumental behavioural patterns (Chapman et al., 2005; Nolen-Hoeksema et al., 2008). The negative thoughts restrict an individual's motivation and drive to follow habitual patterns (Nolen-Hoeksema et al., 2008). Individuals have difficulties in experiencing pleasurable and rewarding actions. Instead, they persist on self-criticism (Nolen-Hoeksema et al., 2008). This can inhibit an individual's motivation to move on with a regular and valued life (Bardeen, & Fergus, 2016). As a result, individuals can develop maladaptive behaviour. They act more aggressively and impulsively (Nolen-Hoeksema et al., 2008; Chapman et al., 2005). These behavioural patterns affect relationships. Close people become disappointed and following, it might that social support decreases (Nolen-Hoeksema et al., 2008).

Third, rumination can impair the psychological functioning of an individual and represents a risk factor for the development of psychopathologies (Davey, 2014, Nolen-Hoeksema et al., 2008; Picket, & Kurby, 2010). It restricts an individual's ability to emphasize positive experiences while the sensitivity for negative experiences grows (Nolen-Hoeksema et al., 2008). This imbalance of positive and negative emotions leads to a tendency to feel more pessimistic and hopeless (Nolen-Hoeksema et al., 2008). This can contribute to the onset of depression. Chawla and Ostafin (2007) found a significant correlation between experiential avoidance and depression.

Finally, rumination negatively influences sleep quality (Carney, Edinger, Meyer, Lindman, & Istre, 2006; Thomson, Mehlsen, Christensen, & Zachariae, 2003). Hence, it is assumed that experiential avoidance can impair sleep as well. In the following part, this paper focuses on sleep disturbances as a mediating factor between experiential avoidance and depression.

Sleep Disturbances

Sleep disturbances are characterized by a low sleep quality (Sivertsen et al., 2014) and frightening dreams (Schredl, & Engelhardt, 2001). Sleep is a resting state (American Heritage Dictionary of the English Language, 2017) in which energy levels are restored (Pinel, 2011). Consequently, sleep is essential for the recovering of vital functions and for the maintenance of health (Smith, 2016). When sleep is disrupted and hence, not refreshing enough, the daily function of an individual can be impaired as well. Sleep disturbances can lead to symptoms, like a negative mood and impaired concentration during the day (Carney et al., 2006; Carney et al., 2010). According to Schredl and Engelhardt (2001), sleep disturbances can also be associated with depression. In the following, sleep disturbances are explained with respect to sleep quality and dreams.

Sleep quality is referred to the efficiency and duration of sleep (Landey, Best, & Liu-Ambrose, 2015). A good sleep quality is present when these features are perceived as being sufficient and satisfying (Landey et al., 2015). Hence, individuals feel rested during the day and have an overall greater health and well-being (Harvey, Stinson, Whitaker, Moskovitz, & Virk, 2008). Contrary to that, low sleep quality is present when the efficiency and duration of sleep decrease (Landey et al., 2015). Individuals have difficulties in falling asleep and they often wake up during the night (Sivertsen et al., 2014). Following, their sleep duration shortens and the individuals feel constantly tired during daytime. Moreover, they have a greater tendency to develop insomnia (Harcey et al., 2008). One aspect that can be a cause for changed sleep patterns are dreams (Schredl, & Engelhardt, 2001).

Dreams are constituted by imaginary plots (Desseilles, Dang-Vu, Sterpenich, & Schwartz, 2010). These plots are based on subjective past experiences that are either of sensational, verbal or emotional nature (Desseilles et al., 2010). In the state of dreaming these experiences get unfolded to actions and events, which further are re-experienced in the form of the imaginary plots (Desseilles et al., 2010). According to Chokroverty (2010), it can be assumed that individuals proceed thoughts about past experiences.

Especially unwanted negative thoughts that were suppressed and avoided during the day can re-occur while sleeping (Bryant, Wyzenbeek, & Weinstein, 2011; Kröner-Borowik, Gosch, Hansen, Borowik, Schredl, & Steil, 2013; Spoormaker, 2008). The process of unfolding negative experiences and thoughts has a contrary effect on the intended avoidance (Spoormaker, 2008). It enhances the repetitive re-occurrence of imaginary plots and leads to rumination (Spoormaker, 2008). Consequently, the negative experiences continue and are re-

experienced more often during sleep (Spoormaker, 2008). This cognitive bias can be compared to the one which underlies experiential avoidance.

The constant presentation of negative elements of experiences can evoke frightening dreams and nightmares (Gehrman, & Harb, 2010). With the onset of these dreams the mental condition seems to get more and more negative and individuals have more frightening feelings (Soffer-Dudek, & Sadeh, 2012). As a result, the frightening dreams represent a high distress to individuals and change their sleep pattern. Delayed bedtimes, waking up in the middle of the night and shorter sleep durations can be consequences (Spoormaker, 2008). These can increase the risk of developing depression (Balgrove, Farmer, and Williams, 2004).

Consequently, it is assumed that sleep disturbances evoked by rumination and nightmares, can be seen as an underlying factor of the relation between experiential avoidance and depression. The third part of this paper focuses on the dependent factor depression.

Depression

Depression is a psychological disorder that affects feelings, thoughts, and actions of an individual. It is characterised by a generally negative and pessimistic tendency (Davey, 2014). According to the World Health Organisation, the major depressive disorder can be considered as one of the most common mental disorders (Fava, & Kendler, 2000; Flint, & Kendler, 2014). The lifetime prevalence of major depression reaches up to 19.0%, and is steadily increasing (Kessler, 2012). Depressive episodes generally reoccur and often lead to a chronic course of the disease. Therefore, depression is described as a life-long episodic disorder that has severe impacts on an individual's life. The World Health Organisation reported that depression is one of the greatest disease burden worldwide (Fava, & Kendler, 2000).

Due to various symptoms, depression can be burdensome (Fava, & Kendler, 2000). Depressive individuals suffer from difficulties in thinking, remembering, concentrating and decision-making (Davey, 2014). Hence, individuals feel uncomfortable and unsatisfied which leads to persistent feelings of sadness, hopelessness and worthlessness (Davey, 2014). Following, an individual's motivation can be affected (Davey, 2014). Depressive individuals have lower levels of energy, feel slowed down and take less initiative. They are generally inactive. A lack of interest and pleasure in daily activities can inhibit habitual patterns, like pursuing hobbies or activities (Davey, 2014). Further, the individual's physical activities can be affected (Davey, 2014). The activities seem less functional and purposeful. Consequently, the overall physical condition is weakened. First, psychomotor activities are retarded which leads to a declaration of speech (Davey, 2014). Second, an inhibition of the vegetative functions change appetite and depression can be associated with weight loss or gain (Davey,

2014; Fava, & Kendler, 2000). Generally, physical disorders can occur that have no specific cause, like general pain, persistent headaches, dizzy spells, indigestion, or constipation (Davey, 2014). Furthermore, tiredness and sleep disturbances occur which lead to insomnia or hypersomnia (Anxiety and Depression Association of America, 2017; Davey, 2014; Fava, & Kendler, 2000; Sivertsen et al., 2014).

When at least five of the mentioned symptoms persist for longer than two weeks, a major depressive episode is present (Davey, 2014). Such an episode strongly interferes with an individual's life. Depressive individuals are not able to fulfil actions that are essential for the own well-being and as a contribution to society (Anxiety and Depression Association of America, 2017). For example, they can have problems to take care of their family or to work productively (Anxiety and Depression Association of America, 2017). Ultimately, depressive individuals can find that life is worth nothing which might lead to suicidal tendencies (Anxiety and Depression Association of America, 2017; Davey, 2014; Platt, Waters, Schulte-Koerne, Engelmann, & Salemink, 2017).

The causes for depression vary. Difficult situations and experiences, like job loss, financial problems, or the death of a loved one, trigger feelings of sadness and bereavement (Anxiety and Depression Association of America, 2017; Davey, 2014). Cognitively vulnerable individuals have difficulties in controlling these experiences so that more negative feelings and thoughts are remembered (Platt et al., 2017). However, there are more possible antecedents and future research should focus more on examining the internal psychological processes which could lead to depression (Greenberg, 2015). One of which experiential avoidance is the most understudied psychological cause of depression within western societies (Chawla, & Ostafin, 2010). The link between experiential avoidance and depression is relatively unclear within empirical research and therefore warrants attention through structured investigation. For the investigation the following research question and hypotheses are considered.

Hypothesis

Studies stated that experiential avoidance is a risk factor for the development of depression. On the basis of Chokroverty (2010), Desseilles et al. (2010) and Spoormarker (2008), it is assumed that this link is connected by the underlying factor sleep disturbances (Hypothesis 3). This path is shown in Figure 1. The aim of this study is to investigate the influence of sleep disturbances on the relationship between experiential avoidance and depression and therefore, the research question is: '*Do sleep disturbances indirectly affect the relationship between experiential avoidance and depression?*'

Based on this research question and literature review, these five hypotheses were formulated:

Hypothesis 1: Experiential avoidance, sleep disturbances and depression are positively related

Hypothesis 2$_a$: Experiential avoidance has a positive effect on depression

Hypothesis 2$_b$: Experiential avoidance has a positive effect on sleep disturbances

Hypothesis 2$_c$: Sleep disturbances have a positive effect on depression

Hypothesis 3: Sleep disturbances indirectly affect the relationship between experiential avoidance and depression

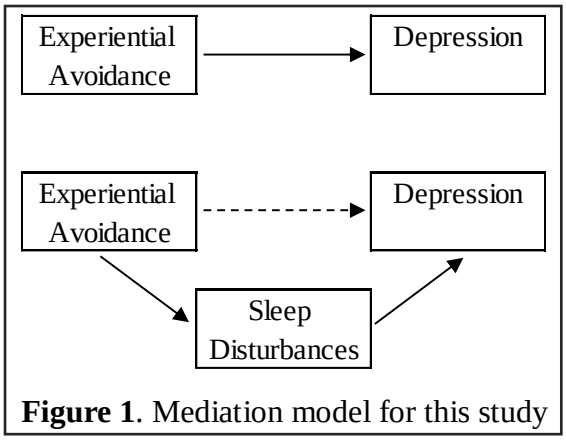

Figure 1. Mediation model for this study

Method

Research Approach

A cross-sectional survey-based research design was employed for the investigation of the relationship between experiential avoidance, sleep disturbances and depression. This research design is adequate for an exploratory research as it represents relationships between variables (Stander, & Van Zyl, 2016). It is a well-structured method which is appealing and easy to use (Van Selm, & Jankowski, 2004). Furthermore, this method is beneficial regarding time and economic aspects (Van Selm, & Jankowski, 2004; Weight, 2005).

Participants

For the study a convenient snowball sampling strategy was chosen to gather information from a diverse group of participants (n = 113). The participants were people from the social environment of students who had a randomly distributed demographic background (Table 1.). The majority of the group were females (66.40%) at the age of 22 (23.90%; μ_{age} = 29.18, σ = 11.97), and with a higher secondary education (61.10%). All participants were non-native English speakers and were able to use a computer and the internet.

Table 1.

Characteristics of participants (N =113)

Variables	Category	Frequency	%
Gender	Male	37	32.7
	Female	75	66.4
	Missing	1	0.9
Age in years	18-20	17	15.0
	21-30	59	52.2
	31-40	11	9.7
	41-50	15	13.3
	51-60	5	4.4
	61 and older	2	1.8
	Missing	4	3.5
Nationality	German	105	92.9
	Dutch	3	2.7
	Other	4	3.5
	Missing	1	0.9
Educational level	Secondary education	7	6.2
	Higher education	69	61.1
	Bachelor's degree	19	16.8
	Master's degree	16	14.2
	Doctorate degree	1	0.9
	Missing	1	0.9
Marital status	Single	49	43.4
	Living with a partner	45	39.8
	Married/ registered partnership	18	15.9
	Missing	1	0.9

Measuring instruments

The data for the study was gathered with the following four questionnaires: (1) biographic background, (2) experiential avoidance, (3) sleep disturbances and (4) depression.

Biographic Background.

The survey began with a self-developed biographic questionnaire to gather information about the biographic background of the participants. This included information about sex, age, nationality, educational qualification, and marital status. For each aspect several answer options were possible.

Experiential Avoidance.

The independent variable "Experiential Avoidance" was measured by the "*Acceptance and Action Questionnaire-2*" (AAQ-2) (Bond et al., in press). This questionnaire was designed to measure an individual's degree of experiential avoidance/acceptance (Bond et al., in press; Pickett, & Kurby, 2010). It is a unidimensional 10-item scale. The items ask how participants would cope during difficult or unpleasant situations. Examples of these items are: "*It's OK if I remember something unpleasant*." (item 1) or "*My painful experiences and memories make it difficult for me to live a life that I would value*" (item 2). The response options are provided by a seven-point Likert-type ranging scale (1 = Never true, 7 = Always true). These options investigate the agreement of a participant with an item. Low scores are an indication for more experiential avoidance (Pickett, & Kurby, 2010). According to Bond et al. (in press), the AAQ-2 has an adequate internal consistency, ranging from .76 to .87. In addition, the test-retest reliability is .81 and .79 which is acceptable (Bond et al., in press).

Sleep Disturbances.

For the mediating variable "Sleep disturbances" a new questionnaire was developed by Susanne Völler. This questionnaire is intended to indicate personal impressions about sleep problems and dreams. Therefore, three items of the "*Pittsburgh Sleep Quality Index*" (PSQI) and four items of the "*Mannheim Dream Questionnaire*" (MADRE) were integrated into one questionnaire. Regarding the assumption that proceed past experiences while dreaming, one item is added that asks whether dreams include past experiences. Hence, it is an 8-item scale using a 5-point Likert-type ranging scale. Examples for measuring sleep disturbances in general are "*I cannot get to sleep within 30 minutes*." (item 2) or "*I wake up in the middle of the night*." (item 3). The answer options range from 1 = Almost never to 5 = Almost always. High scores support the assumption that the individual has sleep disturbances. Examples for determining dreams are "*I experience my dreams very vividly*." (item 6) or "*The dreams are stressful for me."* (item 8). The answer options range from 1 = Strongly disagree to 5 =

Strongly agree. With high scores on these items show that the dreams have a higher chance to contribute to sleep disturbances. Overall, higher scores on this questionnaire are an indication for more rumination during the time of sleep. According to Backhaus, Junghanns, Brooks, Riemann and Hohagen (2002), the PSQI has a test-retest reliability is .87 and can be considered as being acceptable. Moreover, the retest reliability of the MADRE was acceptable as well (*t* = .75, Schredl, Berres, Klingaud, Schnellhaas, & Göritz, 2014)

Depression.

For the dependent variable "Depression" the "*Hospital Anxiety and Depression Scale*" (HADS) from Zigmond and Snaith (1983) was used. This questionnaire determines an individual's level of emotional distress which is characterised by anxiety and depression. Hence, it covers two factors measured by one subscale for anxiety and one for depression. In this study the focus is set on depression and consequently, only the subscale for depression (HADS-D) is considered. The HADS-D is a 7-item scale and contains the items 2, 3, 5, 8, 9, 12, and 14 of the original HADS. The items of the HADS-D reflect on several symptoms of depressive tendencies. Examples for these are: "*I feel as if I am slowed down*." (item 2) or "*I look forward with enjoyment to things*." (item 8). Participants assess to what extent the statements of the items suit them on a 4 point ranging scale (0 = Almost never, 3 = Almost always). Higher scores are indicative for a depressive tendency. For the HADS the psychometric properties were specified as good. Cronbach's alpha varied from .67 to .90 (mean .82) (Bjelland, Dahl, Haug, & Neckelmann, 2002).

Procedure

These questionnaires were integrated in an online survey. This survey was carried out in the context of the Bachelor programme of psychology at the University of Twente and was part of a broader research that also considered the phenomena of experiential avoidance. For other research purposes, the survey contained additional questionnaires about live events, subjective well-being, emotional awareness and personality.

After the research was approved by the ethical commission of the University of Twente, the survey was created with the program "*Qualtrics*" distributed online. The participants were reached verbally, per email or web pages, like Facebook. At the beginning of the survey, they were informed about the purpose of the study and about the procedure. In the informed consent the participants were told that the study is intended to investigate how people cope with difficult situations, and what factors are related to the coping styles. It was explained that the survey takes about 30 minutes to complete and all data are treated purely confidential and anonymously. Finally, the participants were told that their participation is

voluntary and can be stopped at any time. For further questions contact data of responsible students was given. After the informed consent, the participants could decide whether they want to take part or not. Then, every questionnaire was shortly introduced and the items were arranged in a comprehensible order. The participants could answer the questionnaires by ticking the response options that fit best with oneself. The response options were forced to ensure that every question was considered and answered by the participants. The data collection was from the 10th of April to the 30th of April 2017.

Data-analysis

The data was analysed through the use of SPSS 22 (IBM, 2015). First, descriptive statistics (means, standard deviation, skewness and kurtosis) were conducted to determine the distribution of the data. Second, Cronbach's alphas were used to determine the reliability of the questionnaires. The reliability was accepted when the value of Cronbach's alpha was greater than .70 (Nunnally, & Bernstein, 1994). Third, Pearson correlations with a significance level of $p < .001$ were estimated to determine the relationships amongst the variables. These relations and their strengths were further analysed by means of their effect size. The effect size is divided into a small effect size ($.1 < r < .3$); a medium effect size ($.3 < r < .5$); and a large effect size ($r > .5$; Cohen, 1992). Fourth, multiple regressions were used to measure how experiential avoidance and sleep disturbances predict the dependent variable depression. Therefore, the stepwise strategy of Baron and Kenny (1986) was followed to finally determine how sleep disturbances indirectly affect the relationship between experiential avoidance and depression.

Results

The results of the data analysis are reported in a two-phased approach. First, the descriptive statistics, Cronbach alphas and Pearson correlations are reported which were used to evaluate *Hypothesis 1*. Second, the results of the multiple regression analyses are presented. These were used to evaluate the other hypotheses.

Descriptive statistics and Pearson correlations

All means (μ), standard deviations (σ), and Cronbach alphas (α) are reported in Table 2. The table shows that the Cronbach alpha coefficients of the questionnaires about experiential avoidance and depression were acceptable (α > .70; Nunnally, & Bernstein, 1994); whereas the one of the questionnaire about sleep disturbances was questionable (α < .70; Nunnally, 1978).

Table 2

Descriptive statistics, and Cronbach's alpha coefficients

	Variables	μ	σ	α
1	Experiential avoidance	3.27	.96	.84
2	Sleep Disturbances	2.94	.61	.67
3	Depression	.9	.52	.81

The results of Skewness and Kurtosis are presented in Table 3. They indicate that all three variables were normally distributed. Therefore, the Pearson correlation was conducted and it got apparent that all correlations were significantly positive (Table 3). With respect to Cohen (1992) the correlation between experiential avoidance and depression had a large effect ($r = .70$; $p < .001$). Further, the correlation between experiential avoidance and sleep disturbances had a large effect as well ($r = .54$; $p < .001$), while the correlation between sleep disturbances and depression had a medium effect ($r = .37$; $p < .001$). Therefore, *Hypothesis 1* is accepted. The variables experiential avoidance, sleep disturbances, and depression are positively related.

Table 3

Skewness, Kurtosis, and Pearson correlations

		Skewness		Kurtosis			
	Variables	Statistic	SE	Statistic	SE	1	2
1	Experiential avoidance	.58	.23	.64	.45	-	-
2	Sleep Disturbances	.41	.23	-.08	.45	.54*	-
3	Depression	.53	.23	-.16	.45	.70*	.37*

Note. * $p < .001$

Multiple regression analysis

A series of multiple regression analysis was conducted to determine how sleep disturbances mediated the relationship between experiential avoidance and depression. Therefore, the four steps of Baron and Kenny (1986) were followed. These steps represent the four conditions that have to be fulfilled for a complete mediation. First, the direct effect of the independent variable on the dependent variable was analysed, and second, the effect of the independent variable on the mediator was analysed. Third, it was tested whether the independent variable and the mediator predict the dependent variable. Finally, the indirect effect of the mediator was determined. When the mediator controls the relationship between the independent and dependent variables, the direct effect decreases to zero. This is an indication for a complete mediation. To test the mediation, the different standardized beta coefficients were compared (Baron, & Kenny, 1986).

The four steps of the multiple regression analysis were presented in Table 4. Previous results already showed that there is a positive correlation between experiential avoidance and depression. The regression analysis demonstrated that experiential avoidance predicts 49% of the variance of depression ($F_{(1, 112)} = 106.49$, $p < .001$). The standardized beta coefficient of experiential avoidance in this first step was significant (ß = .70, $t = 10.32$; $p < .001$). Therefore, the first condition for a mediation was satisfied and *Hypothesis 2a* is accepted. Experiential avoidance has a positive effect on depression.

Further, it was already found that the correlation between experiential avoidance and sleep disturbances is positive. The regression analysis showed that experiential avoidance predicts 29% of the variance of sleep disturbances ($F_{(1, 112)} = 46.06$, $p < .001$). The standardized beta coefficient of experiential avoidance in this second step was significant (ß = .54, $t = 6.79$; $p < .001$). It can be concluded that the second condition for a mediation was fulfilled. Therefore, *Hypothesis 2b* is accepted. Experiential avoidance has a positive effect on sleep disturbances.

In addition, the correlation between sleep disturbances and depression was found to be positive. The regression analysis demonstrated that sleep disturbances predict only 13% of the variance of depression ($F_{(1,112)} = 17.15$; $p < .001$). The standardized beta coefficient of sleep disturbances was significant (ß = .37; $t = 4.14$; $p < .001$). Hence, the mediator also predicts the dependent variable and *Hypothesis 2c* is accepted. Sleep disturbances have a positive effect on depression.

Finally, the multiple regression analysis demonstrated that sleep disturbances have no indirect effect on the relationship between experiential avoidance and depression. The factors

experiential avoidance and sleep disturbances predict in total 49% of the variance of depression ($F_{(1,112)} = 52.82$; $p < .001$). The standardized beta coefficient of experiential avoidance in the last step was constant and significant (ß = .71; $t = 8.76$; $p < .001$). The standardized beta coefficient of sleep was reduced, but this effect was not significant (ß = -.019; $t = -.30$; $p = .82$). Further, the Sobel test was not significant, and the indirect effect of sleep disturbances could not be supported ($z = -0.17$; $p > .01$). Consequently, *Hypothesis 3* is rejected.

Table 4

Multiple regression analysis with the respective predictor and outcome variable for each of the four steps

		Unstandardized		Standardized					
Step	Variable	B	SE	Beta	t	p	F	R	R’
Step 1							106.49	.70	.49
	(Constant)	-2.36	.87	-	-2.70	.01*	-	-	-
Predictor	EA	.27	.03	.70	10.32	.00*	-	-	-
Outcome	Depression								
Step 2							46.06	.54	.29
	(Constant)	14.58	1.37	-	10.65	.00*	-	-	-
Predictor	EA	.27	.04	.54	6.79	.00*	-	-	-
Outcome	Sleep Disturbances								
Step 3							17.15	.36	.13
	(Constant)	-.16	1.59	-	-.10	.92	-	-	-
Predictor	Sleep Disturbances	.28	.06	.37	4.14	.00*	-	-	-
Outcome	Depression								
Step 4							52.82	.70	.49
	(Constant)	-2.16	1.25	-	-1.73	.09	-	-	-
Predictor	EA	.27	.03	.71	8.76	.00*	-	-	-
Predictor	Sleep Disturbances	-.01	.06	-.02	-.30	.82	-	-	-
Outcome	Depression								

Note. * $p < .01$. Experiential avoidance (EA).

Discussion

The aim of this study was to investigate the indirect effect of sleep disturbances on the relationship between experiential avoidance and depression. The Cronbach alpha coefficients indicate that the variables experiential avoidance and depression were reliable, while the variable sleep disturbances was questionably reliable. Experiential avoidance, sleep disturbances and depression correlate positively. However, sleep disturbances have no significant indirect effect on the relationship between experiential avoidance and depression.

Experiential avoidance has a positive effect on depression

The results of the multiple regression analysis confirm that experiential avoidance predicts depression. Individuals that avoid aversive experiences have a higher tendency to experience depressive episodes. They often ruminate over negative and aversive experiences and also re-experience related negative thoughts (Nolen-Hoeksema et al., 2008). Hence, these experiences dominate the mind (Nolen-Hoeksema et al., 2008) and the resulting negative and pessimistic attitude can contribute to the onset of depression (Platt et al., 2017). It is known that the underlying cognitive biases of depression negatively impair attention, interpretation and memory (Platt et al., 2017). Therefore, cognitively vulnerable individuals have difficulties in controlling negative experiences (Platt et al., 2017). When the attention is particularly focused on aversive information, more experiences are interpreted in a negative way and more negative thoughts are remembered (Platt et al., 2017). Following, these negative thoughts dominate the positive ones (Bardeen, & Fergus, 2016).

According to Nolen-Hoeksema, Wisco, and Lyubomirsky (2008) this imbalance of positive and negative thoughts can be the result of the cognitive bias of rumination. The re-experienced negative thoughts can influence an individual's state of feelings in the way that the individual is more sad and hopeless (Davey, 2014). As this cognitive bias also underlies experiential avoidance a correlation between the two variables can be found. Consequently, it can be concluded that experiential avoidance can affect the onset of depression. This supports findings from previous research (Bond et al., in press; Chapman et al., 2005; Chawla, & Ostafin, 2007; Hayes et al., 2005; Pickett, & Kurby, 2010).

Experiential avoidance has a positive effect on sleep disturbances

The results show that experiential avoidance also predicts sleep disturbances. Individuals who avoid negative experiences have a higher tendency to experience sleep disturbances. The avoidance during the day is intended to suppress and forget negative experiences (Chapman et al., 20105). To achieve this, individuals actively try to distract

themselves by behavioural actions (Chapman et al., 2005; Chawla, & Ostafin, 2007; Pickett, & Kurby, 2010) and cognitive strategies (Bardeen, & Fergus, 2016; Chawla, & Ostafin, 2007; Pickett, & Kurby, 2010). They attempt to suppress their thoughts and emotions (Chapman et al., 2005; Hayes et al., 2005; Pickett, & Kurby, 2010) and try to act adaptively during the day (Schwarzer, 2014).

However, individuals cannot suppress their thoughts while sleeping as they lose control over them (Kröner-Borowik et al., 2013). Hence, the thoughts return in dreams (Kröner-Borowik et al., 2013). This is called the dream rebound effect (Kröner-Borowik et al., 2013). According to Kröner-Borowik et al. (2013), especially avoided aversive thoughts become more accessible during sleep (Chawla, & Ostafin, 2007; Kröner-Borowik et al. 2013). These negative thoughts are present and racing through the mind (Harvey, 2001) so that they can cause sleep disturbances (Thompson, 2015; Carney et al., 2010; Thomson et al., 2003). With respect to the dream rebound effect (Kröner-Borowik, et al., 2013), it can be concluded that the experiences that are intended to be avoided by the strategy of experiential avoidance re-occur during sleep. Consequently, it can be assumed that experiential avoidance and sleep disturbances are correlated and can occur together.

Sleep disturbances have a positive effect on depression

The results indicate that sleep disturbances predict depression. Individuals that suffer from sleep disturbances also have a higher tendency to develop depression. Sleep disturbances influence the daily function of an individual as they lead to impaired attention and concentration (Carney et al., 2010). In the long term, reduced memory capacity and physiological problems, like high blood pressure or strokes, can develop (Chokroverty, 2010). Above all, sleep disturbances negatively influence an emotional state (Chokroverty, 2010). Individuals respond with stronger negative emotions to unpleasant events and less positive to good events (Bower, Bylsma, Morris, & Rottenberg, 2010). Generally, they show a negative mood during the day (Carney et al., 2006; Carney et al., 2010; Chokroverty, 2010). Hence, the quality of life is reduced and depressive tendencies can occur (Chokroverty, 2010).

Bower, Bylsma, Morris and Rottenberg (2010) found that sleep disturbances are a predictor and, further, a common symptom of depression. In the current study, the correlation between the two variables had only a medium effect. Moreover, the multiple regression analysis demonstrated that only 13 % of the variance of depression are predicted by sleep disturbances. Hence, depression can be evoked by many other factors next to sleep disturbances (Davey, 2014). Negative experiences can trigger the onset of depression, but

genetic predispositions, brain abnormalities or neurochemical defects can have an influence as well (Davey, 2014).

Sleep disturbances have no indirect effect

Sleep disturbances do not explain the underlying mechanism of the relationship between experiential avoidance and depression as their mediating effect cannot be found within the current study. Even if it was found that both variables predict in total 49 % of the variance of depression, the influence of sleep disturbances is statistically not significant and seems to be low. The results demonstrated that only 13 % of the variance of depression are predicted by sleep disturbances. In contrast, the predicting effect of experiential avoidance was higher with 49%. Moreover, the variable of sleep disturbances does not reduce the relationship between experiential avoidance and depression. The standardized beta coefficient of experiential avoidance remains about the same (Table 3). Hence, it can be concluded that sleep disturbances do not indirectly effect the relationship. With respect to the effect size it was found that the correlation between experiential avoidance and depression had a large effect, while the one between sleep disturbances and depression had only a medium effect. This indicates that the link between experiential avoidance and depression is stronger than the one between sleep disturbances and depression.

While being awake, individuals are conscious and can respond to stimulation (Thompson, 2015). They can actively chose to avoid negative experiences (Bardeen, & Fergus, 2016; Chapman et al., 2005; Chawla, & Ostafin, 2007; Pickett, & Kurby, 2010; Schwarzer, 2014). This is attributable to more complex patterns of brain areas and a large-scale activity (Thompson, 2015). While sleeping this activity seems to be reduced as it was found to be localized and limited in the brain (Thompson, 2015). Hence, information processing is reduced as well and it can be assumed that consciousness decreases in the state of sleep (Thompson, 2015). On the basis of this assumption, it can be concluded that individuals proceed and ruminate their negative thoughts less often while sleeping. They are more aware of the negative thoughts during the day when they actively make use of the strategy of experiential avoidance. Following, experiential avoidance might demand high cognitive effort so that it has a more negative impact on an individual's life than sleep disturbances. Consequently, experiential avoidance has a stronger predicting effect on depression than sleep disturbances and it can be concluded that sleep disturbances have no mediating effect on the relationship between experiential avoidance and depression when sleep is seen as an unconscious state.

However, opposing opinions say that sleep is a conscious (Thompson, 2015). Especially while dreaming individuals are conscious (Desseilles et al., 2010), because then they enact plots about experiences and ruminate them (Spoormarker, 2008). Therefore, it can be concluded that sleep problems can play an important role in the processing of experiences and can contribute to the onset of depression. As mentioned earlier, experiential avoidance leads to an improved encoding of aversive experiences in the long-term memory (Saccet et al., 2017). Hence, it is assumed that these experiences are constantly present in the mind while being awake and asleep. Hence, individuals can struggle in both states with past experiences and sleep disturbances can have an important effect on the relationship between experiential avoidance and depression. This effect could have been further influenced by other unknown mediating variables or some limitations of the study so that the predicting effect of sleep disturbances was found to be not significant.

Limitations and implications

The questionnaire about sleep disturbances could also have an impact on these results as its reliability is questionable. It is recommended to reconsider the psychometric properties of the questionnaire. Some items should be modified to establish a unidimensional questionnaire. Consequently, more precise results could be achieved. Moreover, future research should focus on the investigation of sleep and the definition of the cognitive activities while sleeping. According to Thompson (2015), the working mechanisms while sleeping are not fully identified. These mechanisms and the role of consciousness need to be defined to gain more insight in the effect of sleep disturbances on other variables and relationships.

Further, the research design was not completely appropriate for the study. In the current study the cross-sectional survey-based research design was used. This design ensures no control over the participants. Hence, the accuracy of responses cannot be guaranteed (Weight, 2005). A self-sampling bias could occur, or the participation could be influenced by deception (Weight, 2005). Longitudinal studies could be conducted to provide more insight in the cognitive bias of experiential avoidance and the role of sleep disturbances. In addition, the amount of questionnaires in the survey needs to be limited. In the current study five research questions were answered by means of eight questionnaires. Hence, the survey took about 30 to 45 minutes. Some participants told that they needed about an hour. This could have overstretched the concentration and the responses were less accurate in the end.

However, the study as such had several strengths that made the results credible and worth appreciating. For example, the scales for experiential avoidance and depression

demonstrate that they were reliable and adequate for the research. Further, the use of the survey demanded no highly physical or mental stress. The point-and-click response form was easy to understand and to handle, and the flexible time made the participation comfortable (Van Selm, & Jankowski, 2004). In addition, there was no interviewer bias and the answers could be given with honesty and tranquillity (Weight, 2015). All in all, the participation was voluntary and anonymous and the data were treated confidential and hence the study was ethical. These aspects need to be considered in future research as well.

Future research should also focus on the underlying mechanisms of the relationship between experiential avoidance and depression. Next to rumination other cognitive biases can be considered. According to Hayes et al. (2013), psychological inflexibility can be associated with experiential avoidance. Experiential avoidance narrows an individual's flexibility and results in attentional inflexibility (Hayes et al., 2013). Therefore, individuals have difficulties to focus on valuable and positive events (Hayes et al., 2013). This can contribute to the onset of depression as well. In future research, this and other cognitive biases should be further studied.

The scientific achievement of this study can be integrated in the treatment of depression. It is important to discover suppressed aversive experiences and thoughts. Experiential avoidance is a maladaptive strategy that leads to a more negative attitude (Pickett, & Kurby, 2010; Chawla, & Ostafin, 2007; Hayes et al., 2013). With respect to the improved encoding in the long-term memory (Saccet et al., 2010), it can be assumed that the negative thoughts are ruminated again while sleeping. Consequently, it is important to consider sleep patterns and the retrieval of dreams as they can provide more insight into the nature of negative experiences. Following, individuals can learn to cope with these experiences and to tolerate and accept them (Hayes et al., 2013). Hence, they become more flexible in dealing with them and the negative thoughts do not dominate the mind any longer (Hayes et al., 2013). Following, the act of avoidance can become less common and depressive tendencies can be prevented.

All in all, this research demonstrated that sleep disturbances have no indirect effect on the relationship between experiential avoidance and depression. However, it got apparent that the three variables are positively related to each other. Future research should focus more on the exploration of cognitive causes for depression and how certain strategies can reduce depressive tendencies. Consequently, the life of individuals can be improved and the societal burden reduced.

Acknowledgements

This Bachelor thesis was written for the faculty of Positive Psychology and Technology at the University of Twente. I thank Hester R. Trompetter for the first insight in the topic of experiential avoidance and Lewellyn E. van Zyl for the supportive supervising.

References

American Heritage Dictionary of the English Language (2017, 14th of June). Sleep. Retrieved from: https://www.ahdictionary.com/word/search.html?q=sleep.

Anxiety and Depression Association of America (2017, 29th of April). Understand the Facts Depression. Retrieved from: https://www.adaa.org/understanding-anxiety/depression.

Backhaus, J., Junghanns, K., Brooks, A., Riemann, D., Hohagen, F. (2002) Test-retest reliability and validity of the Pittsburgh Sleep Quality Index in primary insomnia. *Journal of psychometric research, 53*(3), 737-740.

Balgrove, M., Farmer, L, & Williams, E. (2004). The relationship of nightmare frequency and nightmare distress to well-being. *Journal Sleep Research, 13*(2), 129-36. doi: 10.1111/j.1365-2869.2004.00394.x

Bardeen, J. R., & Fergus, T. A. (2016). The interactive effect of cognitive fusion and experiential avoidance on anxiety, depression, stress and posttraumatic stress symptoms. *Journal of Contextual Behavioural Science, 5*, 1-6. doi: http://dx.doi.org/10.1016/j.jcbs.2016.02.002

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.

Bjelland, I., Dahl, A. A., Haug, T. T., Neckelmann, D. (2002). The validity of the Hospital Anxiety and Depression Scale. An updated literature review. *Journal of Psychosomatric Research, 52*(2), 67-77. doi: 10.1016/S0022-3999(01)00296-3

Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., Waltz, T., & Zettle, R. D. (in press). Preliminary psychometric properties of the Acceptance and Action Questionnaire – II: A revised measure of psychological inflexibility and experiential avoidance. Behavior Therapy (in press).

Bower, B., Bylsma, L. M., Morris, B. H., Rottenberg, J. (2010). Poor reported sleep quality predicts low positive affect in daily life among healthy and mood-disordered persons. *Journal of Sleep Research, 19*(2), 323-332. doi: 10.1111/j.1365-2869.2009.00816.x

Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2005). Solving the puzzle of deliberate self harm: The experiential avoidance model. *Behaviour Research and Therapy, 44*, 371-394. doi:10.1016/j.brat.2005.03.005.

Carney, C. E., Edinger, J. D., Meyer, B., Lindman, L., & Istre, T. (2006). Symptom-Focused Rumination and Sleep Disturbances. *Behavioural Sleep Medicine, 4*(4), 228-241. doi: http://dx.doi.org/10.1207/s15402010bsm0404_3

Carney, C. E., Harris, A. L., Moss, T. G., & Edinger, J. D. (2010). Distinguishing Rumination from Worry in Clinical Insomnia. *Behavioural Research Therapy, 48*(6), 540-546. doi: 10.1016/j.brat.2010.03.004

Chawla, N., & Ostafin, B. (2007). Experiential Avoidance as a Functional Dimensional Approach to Psychopathology: An Empirical Review. *Journal of Clinical Psychology, 63*(9), 871-890. doi: 10.1002/jclp.20400

Chokroverty, S. (2010). Overview of sleep & sleep disorders. *Indian Journal of Medical Research, 131*(2), 126-140.

Cohen, J. (1992). "A power primer". *Psychological Bulletin. 112*(1), 155-159. doi: 10.1037/0033-2909.112.1.155. PMID 19565683

Davey, G. (2014). Depression and Mood Disorders. *Psychopathology.* (pp. 196-214). New York, NY: Wiley.

Desseilles, M., Dang-Vu, T. T., Sterpenich, V., & Schwartz, S. (2010). Cognitive and emotional processes during dreaming: A neuroimaging view. *Consciousness and Cognition, 20,* 998-1008. doi:10.1016/j.concog.2010.10.005

Fava, M., & Kendler, K. S. (2000). Major Depressive Disorder, *Neuron, 28,* 335-341. doi: http://dx.doi.org/10.1016/S0896-6273(00)00112-4

Flint, J., & Kendler, K. S. (2014). The Genetics of Major Depression. *Neuron, 8*, 484-503. doi: http://dx.doi.org/10.1016/j.neuron.2014.01.027

Gehrman, P. R., & Harb, G. C. (2010). Treatment of Nightmares in the Context of Posttraumatic Stress Disorder. *Journal of Clinical Psychology, 66*(11), 1185-1194. doi: 10.1002/jclp.20730

Greenberg, P. E. (2015, April 29). The Growing Economic Burden of Depression in the U.S. Scientific American. [MIND Guest Blog]. Retrieved from: https://blogs.scientificamerican.com/mind-guest-blog/the-growing-economic-burden-of-depression-in-the-u-s/

Hayes, S. C., Levin, M. E., Plumg-Vilardaga, J., Villatte, J. L., & Pistorello, J. (2013). Acceptance and Commitment Therapy and Contextual Behavioural Science: Examining the Progress of a Distinctive Model of Behavioural and Cognitive Therapy. *Behaviour Therapy, 44,* 180-198. doi: http://dx.doi.org/10.1016/j.beth.2009.08.002

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2005). Acceptance and Commitment Therapy: Model, processes and outcomes. *Behaviour Research and Therapy, 44,* 1–25. doi: 10.1016/j.brat.2005.06.006

Harvey, A. G. (2001). I can't sleep my mind is racing! An investigation of strategies of thought control in insomnia. *Behavioural and Cognitive Psychotherapy, 29*(1), 3-11. doi: https://doi.org/10.1017/S1352465801001023

Harvey, A. G., Stinson, K., Whitaker, K. L., Moskovitz, D., & Virk, H. (2008). The Subjective Meaning of Sleep Quality: A Comparison of Individuals with and without Insomnia, *Sleep Research Society, 31*(3), 383-393.

Hicks, J. A., & Routledge, C. (2013). *Emotions and Meaning in Life: A Motivational Perspective*, (p. 124-125), Dordrecht: Springer. doi: 10.1007/978-94-007-6527-6

Kessler, R. C. (2012). The Costs of Depression. *Psychiatric Clinics of North America, 35*(1), 1-14. doi: 10.1016/j.psc.2011.11.005

Kröner-Borowik, T., Gosch, S., Hansen, K., Borowik, B., Schredl, M., & Steil, R. (2013). The effects of suppressing intrusive thoughts on dream content, dream distress and psychological parameters. *Journal of Sleep Research, 22*(5), 600-604. doi: 10.1111/jsr.12058

Landey, G. J., Best, J. R., Liu-Ambrose, T. (2015). Measuring sleep quality in older adults: A comparison using subjective and objective methods. *Frontiers in Aging Neuroscience, 7*, 166. doi: 10.3389/fnagi.2015.00166.

Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking Rumination. *Perspectives on Psychological Science, 3*(5), 4000-424. doi: http://dx.doi.org/10.1111/j.1745-6924.2008.00088.x

Nunnally, J. C. (1978). *Psychometric theory* (2nd edition). New York, NY: McGraw-Hill.

Nunnally J. C., & Bernstein L. (1994). *Psychometric theory* (3rd edition). New York, NY: McGraw-Hill.

Pickett, S. M., & Kurby, C. A. (2010). The Impact of Experiential Avoidance on the Inference of Characters' Emotions: Evidence for an Emotional Processing Bias. *Cognitive Therapy and Research, 34*, 493-500. doi: 10.1007/s10608-009-9262-x

Pinel, J. P. J. (2011). Sleep, Dreaming, and Circadian Rhythms. *Biopsychology*. New York, NY: Pearson Education. Inc.

Platt, B., Waters, A. M., Schulte-Koerne, G., Engelmann, L., & Salemink, E. (2017). A review of cognitive biases in youth depression: attention, interpretation and memory. *Cognition and Emotion, 31*(3), 462-483. doi: 10.1080/02699931.2015.1127215

Saccet, M. D., Levy, B. J., Hamilton, J. P., Maksimovskiy, A., Hertel, P. T., Joormann, J., Anderson, M. C., Wagner, A. D., Gotlib, I. H. (2017). Cognitive and neural consequences of memory suppression in major depressive disorder. *Cognitive Affect Behavioural Neuroscience, 17,* 77-93. doi: 10.3758/s13415-016-0464-x

Schredl, M., Berres, S., Klingauf A., Schellhaas, S., Göritz, A. S. (2014). The Mannheim Dream questionnaire (MADRE): Retest reliability, age and gender effects. *International Journal of Dream Research, 7*(2). 141-147. doi: http://dx.doi.org/10.11588/ijodr.2014.2.16675

Schredl, M., & Engelhardt, H. (2001). Dreaming and Psychopathology: Dream Recall and Dream Content of Psychiatric Inpatients. *Sleep and Hypnosis, 3*(1), 44-54.

Schwarzer, R. (2014). *Self-efficacy: Thought control of action*. New York, NY: Routledge.

Sivertsen, B., Harvey, A. G., Lundervold, A. j., & Hysing, M. (2014). Sleep problems and depression in adolescence: results from a large population-based study of Norwegian adolescents aged 16-18 years. *European Child & Adolescent Psychiatry, 23*(8), 681-689. doi: 10.1007/s00787-013-0502-y

Smith, Y. (2016) Function of Sleep. [News Medical Life Science], Retrieved from http://www.news-medical.net/health/Function-of-Sleep.aspx

Soffer-Dudek, & Sadeh, A. (2012). Dream Recall Frequency and Unusual Dream Experiences in Early Adolescence: Longitudinal Links to Behavior Problems, *Journal of Research on Adolescence, 23*(4), 635-651. doi: 10.1111/jora.12007

Spoormaker, V. I. (2008). A cognitive model of recurrent nightmares. *International Journal of Dream Research, (1)*1, 15-22.

Stander, F. W., & Van Zyl, L. E. (2016). See you at the match: motivation for sport consumption and intrinsic psychological reward of premier football league spectators in South Africa. *SA Journal of Industrial Psychology, 42*(1), 1312. doi: http://dx.doi.org/10.4102/sajip.v42i1.1312

Thompson, E. (2015). Dreamless Sleep, the Embodied Mind, and Consciousness – The Relevance of a Classical Indian Debate to Cognitive Science. *Open MIND, 37*(T). doi: 10.15502/9783958570351

Thomson, D. K., Mehlsen, M. Y., Christensen, S., & Zachariae, R. (2003) Rumination – relationship with negative mood and sleep quality, *Personality and Individual Differences, 34*(7), 1293-1301. doi: https://doi.org/10.1016/S0191-8869(02)00120-4

Van Zyl, L. E., & Rothmann, S. (2014). Towards happiness interventions: Construct clarification and intervention methodologies. *Journal of Psychology in Africa*, *24*(4), 327–341

Weight, K. B. (2005). Researching Internet-Based Populations: Advantages and Disadvantages of Online Survey Research, Online Questionnaire Authoring Software Packages, and Web Survey Services. *Journal of Computer-Mediated Communication, 10*(3), 00-00. doi: 10.1111/j.1083-6101.2005.tb00259.x

Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta psychiatrica scandinavica*, *67*(6), 361-370. doi: 10.1111/j.1600-0447.1983.tb09716.x

Appendix

The online survey about "Experiential Avoidance"

Data collection (10th of April to 30th of April)

Welcome, Thank you for taking part in our survey. It is part of the Bachelor programme 'Positive Psychology and Technology' of the University of Twente. The aim of the survey is to study how people cope with difficult or aversive situations or experiences, and what factors are related to such coping styles. We will present you several questionnaires that cover different topics, including important life-events, personality, sleep patterns, and the way you cope with stressful situations and feelings.

Completing the survey will take about 30 minutes. All data will be treated purely confidential and anonymous. The participation in this survey is voluntary which means that you have the right to cancel participation at any point.

For further questions please do not hesitate to contact the researchers:

Marte Disse, m.r.disse@student.utwente.nl
Joel Fey, j.fey@student.utwente.nl
Michael Freimann, m.freimann@student.utwente.nl
Johanna Meyer, j.j.meyer@student.utwente.nl
Susanne Völler, s.l.k.voller@student.utwente.nl

Q2 I understand the information provided above and want to take part in this study.

- ❍ Yes (1)

Qextra First, we would like to ask you for some background information.

Q3 What is your sex?

- ❍ Male (1)
- ❍ Female (2)

Q4 How old are you?

Q5 What is your marital status?

- ❍ Single (1)
- ❍ With partner (2)
- ❍ Married/ registered partnership (3)
- ❍ Divorced (4)
- ❍ Widowed (5)

Q6 What is your nationality?

- German (1)
- Dutch (2)
- English (3)
- Others (4)

Q7 What is your highest educational qualification?

- Primary School (Grundschule, Basisschool) (1)
- Vocational Education (e.g. Hauptschule, LBO, VMBO) (2)
- Secondary Education (e.g. Realschule, MAVO) (3)
- Higher Secondary Education (e.g. Abitur, Fachhochschulreife, HAVO, VWO) (4)
- Bachelor's Degree (5)
- Master's Degree (6)
- Doctorate Degree (7)

Q87 This questionnaire is about aversive situations or experiences in general. People differ a lot in the way they cope in stressful situations. Please indicate to what extent the statements are true for you.

	Never true (1)	Very seldom true (2)	Seldom true (3)	Sometimes true (4)	Frequently true (5)	Almost always true (6)	Always true (7)
Its OK if I remember something unpleasant. (1)	❍	❍	❍	❍	❍	❍	❍
My painful experiences and memories make it difficult for me to live a life that I would value (2)	❍	❍	❍	❍	❍	❍	❍
I'm afraid of my feelings. (3)	❍	❍	❍	❍	❍	❍	❍
I worry about not being able to control my worries and feelings. (4)	❍	❍	❍	❍	❍	❍	❍
My painful memories prevent me from having a fulfilling life. (5)	❍	❍	❍	❍	❍	❍	❍
I am in control of my life. (6)	❍	❍	❍	❍	❍	❍	❍
Emotions cause problems in my life. (7)	❍	❍	❍	❍	❍	❍	❍
It seems like most people are handling their lives better than I am. (8)	❍	❍	❍	❍	❍	❍	❍
Worries get in the way of my success. (9)	❍	❍	❍	❍	❍	❍	❍
My thoughts and feelings do not get in the way of how I want to live my life. (10)	❍	❍	❍	❍	❍	❍	❍

Q88 This questionnaire is about sleep pattern. Sleep is a state of rest for the body and mind. It is an essential time for the recovering of vital functions and for the maintenance of health. When this time is disturbed and the sleep is not refreshing, people feel tired or have a bad mood during the day.

Sleep quality is the subjective assessment how satisfied someone is with the own sleep. Please think about your own sleep quality during the past month. Then answer the following question.

	Very good (1)	Fairly good (2)	Normal (3)	Fairly bad (4)	Very bad (5)
How would you rate your sleep quality overall? (1)	❍	❍	❍	❍	❍

Q89 Please think about your sleep patterns during the past month. Then evaluate the following statements and indicate to what extend they fit with your personal impression.

	Almost never (1)	Sometimes (2)	About half of the time (3)	Most of the time (4)	Almost always (5)
I cannot get to sleep within 30 minutes. (1)	❍	❍	❍	❍	❍
I wake up in the middle of the night or early morning. (2)	❍	❍	❍	❍	❍
I dream while sleeping. (3)	❍	❍	❍	❍	❍

Q90 Dreams can occur during sleep. They are imaginations that pass through the mind. People vary in their experience of dreams. Please think about your own dreams and how you would describe them. Then indicate to what extend you agree or disagree with the following statements.

	Strongly disagree (1)	Disagree (2)	Neither agree or disagree (3)	Agree (4)	Strongly agree (5)
The dreams are about my own past experiences. (1)	❍	❍	❍	❍	❍
I experience my dreams very vividly. (2)	❍	❍	❍	❍	❍
The emotional tone of my dreams is very positive. (3)	❍	❍	❍	❍	❍
The dreams are stressful for me. (4)	❍	❍	❍	❍	❍

Q91 This questionnaire contains statements about different thoughts, feelings and actions. Please indicate to what extend the statements suit you.

	Almost never (1)	Sometimes (2)	Most of the time (3)	Almost always (4)
I feel tense or wound up (1)	❍	❍	❍	❍
I feel as if I am slowed down (2)	❍	❍	❍	❍
I still enjoy the things I used to enjoy (3)	❍	❍	❍	❍
I get a sort of frightened feeling as if something awful is about to happen (4)	❍	❍	❍	❍
I can laugh and see the funny side of things (5)	❍	❍	❍	❍
I feel restless as I have to be on the move (6)	❍	❍	❍	❍
Worrying thoughts go through my mind (7)	❍	❍	❍	❍
I look forward with enjoyment to things (8)	❍	❍	❍	❍
I feel cheerful (9)	❍	❍	❍	❍
I get sudden feelings of panic (10)	❍	❍	❍	❍
I can sit at ease and feel relaxed (11)	❍	❍	❍	❍
I can enjoy a good book or radio or TV program (12)	❍	❍	❍	❍
I get a sort of frightened feeling like ‘butterflies’ in the stomach (13)	❍	❍	❍	❍
I have lost interest in my appearance (14)	❍	❍	❍	❍