

The 7x4 field: the seven categories for reasons behind sleeping problems, and the four cornerstones of a healthy life.

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Abstract

Each year there are numerous scientific publications about sleeping problems. Utilising this information to prevent mental problems and disorders, as well as abnormal negative behaviour, practically calls for a functional method of categorisation. A 7x4 field for this precise purpose has been in development in Finland since the 1980s. This article explores this field's applicability in tackling sleeping problems. The study in question utilised a multitude of research reports on sleeping problems and placed them within the 7x4 field. According to the results, sleeping problems can be assigned to seven major categories. The four cornerstones of well-being included in the 7x4 field also bring structure to the enormous amount of data and serve the purposes of preventative measures.

Introduction

Sleeping is as important to people as eating and drinking are. As such, there are millions of reports on sleeping problems. The following includes some randomised samples from Finland alone: "Sometimes I wake up automatically at 3.30 AM, as I can tell the morning newspaper is about to be dropped through my mail slot..." "Occasionally, when thoughts start running through my head vividly – at around 5 AM..." "At times, when I have been up reading a romantic novel at 6 AM..." "On some weekends I feel a click at 5.44 AM, knowing that I can drink my morning coffee and fetch the newspaper at any time, and then go back to bed, as there's no work. During that sleepless period in February, I was thinking about an issue at work that would take place in the summer. I was invited to give a speech at the end of the week. It would be a long way from home. My employers would pay for the trips, however. I did of course have information and things to tell. But was there a reason, should I tell how important it is for them? Or myself? I feel at odds. At night I felt optimistic. Now I am hesitant though... Will I wake up to this tomorrow night too? Or can I come up with a solution by bedtime? I promised to give my answer on Monday." The person who wrote this also posted a picture of flowers on Facebook while thinking these thoughts.

This already points to noticeable sleeping problems: what does the person wish for in their time alone ("...when thoughts start running through my head vividly")? Is this a part of the prevailing culture ("...was there a reason, should I tell how important it is for them? Or myself")? Are relationship problems behind the lack of sleep ("...how important it is for them? Or myself")? Are problems related to travelling too much for a person ("it would be a long way from home")? Do one's dreams and sexuality also play a part ("sometimes, when I have been up reading a romantic novel...")? Is there an expression of freedom involved (the picture of flowers, drinking coffee and fetching the paper at any time)?

The best-known classifications for sleeping problems have to do with the disease classifications for DSM and ICD (WHO 2011 & American Psychiatric Association 2013): **sleep disorders, sleep pattern disorders, sleep apnea, fatigue related to the central nervous system, abnormal movements during sleep, special sleep disorders, other sleep disorders and sleep disorders related to other health problems.** This goes to show that classifying sleep disorders by diagnosis alone provides a poor understanding of causality, treatment options and links to overall well-being. The aforementioned examples already describe a phenomenon related to an overflow of information, known in Finland as “information colic”. This is the outset of the present study; examining preventative work regarding mental well-being, disorders and abnormal negative behaviour in the midst of massive floods of information, while incorporating research on sleeping disorders.

The research problem

Can a new step in preventative mental healthcare be achieved by examining sleeping disorders using the classification field (Heiska 2016), first introduced in 1984, regarding mental well-being, disorders and negative behaviour patterns, and which includes **seven main categories for reasons behind sleeping disorders**, which in turn affect the **four cornerstones of well-being**?

Methodology

Hundreds of scientific studies regarding sleeping problems were gathered and placed in the 7x4 field, whose 28 subcategories are described in the following:

THE CORNERSTONES OF WELL-BEING

- A) Interpersonal relationships
- B) Physical condition and physical exercise
- C) A rational Action
- D) Actions regarding behaviour one's world view

MAIN CATEGORIES FOR REASONS

- 1) Types of loneliness
- 2) Models and patterns
- 3) Types of stress
- 4) Experiences of punishment and disappointment
- 5) Feelings of loss
- 6) Things to avoid
- 7) Changes

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Results

The following features 76 essential scientific research results placed within the 7x4 field:

TYPES OF LONELINESS

Sleeplessness and the march of time in loneliness: The examination of sleeping logs and negative experiences of loneliness from people over the age of 65 revealed statistically significant links between these variables (McHugh & Lawlor 2012).

Inability to sleep due to a bodily disorder that cannot be helped: The effects of diabetes on one's sleep and the effects of sleeping problems on diabetes can form a vicious and lonely cycle for those suffering from both. This phenomenon was observed in eleven young men in a laboratory study (Spiegel et al. 1999).

Inability to sleep due to a disturbance related to loneliness in one's sleeping environment: Out of a large group of working people with low chances of social contact at work, 45% exhibited pronounced fatigue, nervousness, sleeping problems, digestive problems etc. Out of those with high amounts of social contact, only 11% exhibited these symptoms (Bolinder & Ohlström 1971).

Inability to sleep due to irrational, repetitive thoughts: The final step of grief in Kübler-Ross' model of the five stages of grief (Kübler-Ross 1969) is the acceptance of loss. However, the following observations have been made: "when I can't sleep at night, I start hearing the breath of my late husband, as if he's sleeping next to me. It usually makes me feel good and at peace, helping me get to sleep". This phenomenon relates to the theory of continuing bonds, which suggests that relationships may continue beyond death (Siltala 2020).

PATTERNS

Attitudes toward sleep disorders in one's immediate environment: One reoccurring reason for sleeplessness in many studies seems to be people's attitudes toward sleeping (Kannas et al. 2013).

Sleep talking: The following argument can be made based on the analyses of several studies: Even though sleep talkers produce understandable words, their content does not reveal sensitive information. Sleep talking occurs during all stages of sleep and regardless of whether the subject has dreams. The most coherent speech occurs during light sleep. Sleep deprivation, stress, depression, intoxication and fever are causally linked to sleep talking. The phenomenon is typically a passing one (Leo 2003).

Bedtime rituals: An examination of schoolchildren aged 5–11 following different bedtime rules pointed out a statistic link between the quality of sleep and daily behavioural problems (Biggs et al. 2011). Based on interviews with Finnish people, individual rituals before bedtime are linked to the quality and duration of sleep (Sutela 2008).

ASMR (Autonomous Sensory Meridian Response): ASMR refers to autonomically relaxing sensory experiences felt in calm situations, mainly through hearing, vision and touch. Thanks to several analyses, the following is known about ASMR: the experience is akin to the sensation of orgasm, in terms of subjective experience and physiological test results. Many people do not have ASMR experiences, but these have become a significant topic within the study of sleeping problems. Many subjects do experience ASMR when they hear someone speaking calmly or in a whisper, when they hear birds chirping, the sound of trees in the wind, or even when a book is tapped with one finger. Making eye contact may trigger an ASMR experience in some people (Lloyd et al. 2017).

Diet and sleep: In a laboratory test, test subjects of average weight slept from 10 PM to 7 AM for five nights. During four of these days, their diet was optimally healthy. On the fifth day, each subject could eat what they wanted. Eating foods with plenty of fats and sugars led to an average of 29

minutes before falling asleep. When the subjects ate “optimally”, the average time for falling asleep was 17 minutes (St-Onge et al. 2016).

Relaxation exercises and sleep: Out of an analysis of 124 studies on yoga, which primarily focused on the connections between yoga and disorders of the body and mind, no study fulfilled strict scientific criteria. However, sixteen research reports featured reliable data, according to which yoga alleviates insomnia and even mild depression, schizophrenia, as well as lack of attentiveness and overstimulation in young people. A causal relationship between yoga and eating disorders could not be identified (Balasubramaniam et al. 2013).

Insomnia during early morning hours: Persons suffering from this issue can get to sleep easily, but tend to wake up during the early morning hours, which weakens their physical and mental quality of life. One in three people in Finland suffer from this disorder, which is considered an alarmingly high number. Causalities related to this phenomenon are, however unknown (Väätäinen et al. 2013).

Sleep walking: According to several studies, sleep walkers saunter around a room with their eyes open, but might even have sex or drive a car. Waking them up is difficult, and they tend to forget about the entire situation afterwards. This type of behaviour, which typically occurs 1–2 hours from falling asleep, is guided by an ancient mechanism of survival. It is related to a person’s fight-or-flight response and genetic makeup. Sleep medication, allergy medication with tiring effects, alcohol use, stress, fatigue, sleep deprivation, anxiety, fever, an unfamiliar place and noise also have links to the phenomenon (Terzaghi et al. 2009).

Nocturia: Analyses from several studies suggest the following: If the need to urinate wakes a person up more than twice per night, treatment should be started. Urinary tract infections, prostate problems, vaginal dryness, hormonal changes, urinary continence, nocturia and an overactive bladder are among common reasons. In nocturia, a person accumulates excessive urine in their bladder at nights. An overactive bladder is significant in the way that it might develop into a habit and a vicious cycle, in which a person is constantly worried about being able to urinate (Van Kerrebroek et al. 2002).

Sleeping naked: To summarize several studies, sleeping naked has the following effects: increased quality of sleep, faster time to fall asleep, less chance of vaginal yeast infection, increased sperm quality in men, improvements in the quality of relationships and even increased self-confidence (Weatherspoon 2019).

Choice of blanket in bed: According to preliminary questionnaires and comparisons, using a so-called weighted blanket can help many people who suffer from insomnia. A weighted blanket is a blanket with added weight according to a person’s preferences (Ackerley et al. 2015).

Circadian rhythms and sleep: When a US school moved the start of the school day ahead by half an hour, 44% of students participating in the trial reported sleeping for eight hours each night. Before, the figure had been 18%. Perceived depression and caffeine consumption also diminished. There were, however, no changes to the completion of school work or attendance to extracurricular activities (Kelley et al. 2014). Results derived from Finnish data suggested the following: a significant factor affecting students’ daytime fatigue, sleeping problems, insomnia and sleep disorders were similar problems experienced by their parents (Saarenpää-Heikkilä 2001).

Irregular bedtimes and wake-up times: A study carried out in the United States suggests the following: even though research subjects slept for reasonably long each night, those with irregular sleeping habits were more prone to cardiovascular disorders compared to those with regular sleeping schedules (Huang et al. 2020). Even though people over the age of 65 had generally moved their bedtimes later than the group consisting of 45–64-year-olds, taking a long time to fall asleep was still

common in the group of people who slept irrationally. The data was gathered via interviews (Partinen et al. 1983). The 13–26 age group featured the least amount of subjects waking up early in the morning. Those between the ages of 20–30 typically felt better in the morning than in the evening. Starting from the age of 21, people start to wake up early more often and feel better in the morning than in the evening. Earlier wake-up times exhibited in endogenous depression are partly related to normal variation with age, since the results are from people between the ages of 9–60 (Abe et al. 1985).

Napping: In one study, test subjects who had slept well for three consecutive nights tried to solve an overly difficult intellectual task. One half of the group watched a nature video for an hour and the other half took a nap, after which all of them returned to the task. The test was repeated several times. The following observations were made: before the break, both groups spent a roughly equal amount of time on trying to solve the task. After the break, the group who had taken a nap remained focused on the task for much longer than the nature video group. When interviewed, they reported feeling less frustrated or impulsive (Goldschmied et al. 2015). The following conclusions can be drawn from several studies: the ideal length for a nap is twenty minutes. A so-called **power nap** is best achieved by drinking a caffeinated drink before the nap. Waking up without an external stimulus, such as an alarm clock reduces the feeling of grogginess after a night's sleep (Ikeda & Hayashi 2010).

Beauty sleep: In one laboratory experiment, healthy 18–31-year-olds were first photographed after a well-slept night, then made stay up and photographed again. After this, a group of people between the ages of 18–61 evaluated the photographs. This group considered the first batch of pictures almost unanimously better in terms of the subjects' fatigue level, appearance of health and attractiveness (Axelsson et al. 2010).

Sleeping and sexuality: To some people, an orgasm following sexual activity works as a sleeping aid, while for others it delays their sleep. Based on numerous studies, it can be asserted that coming close but not quite experiencing an orgasm usually results in a state of awakeness (Stevenson, S. & Gottfried, S. 2016). Even some of those considering themselves asexual might masturbate in order to achieve a good night's sleep (Yule et al. 2017). Around 65% of interviewees considered that their quality of sleep is improved and sleep is more easily achieved after an orgasm experienced either alone or with a partner (Lastella et al. 2019). During REM sleep, men almost always exhibit an erection, which may be linked to dreams. Women also exhibit a similar phenomenon (Affani et al. 2001).

Sleep preaching: The following conclusions can be drawn based on research on this subject: sleep preaching is a trance-like phenomenon that dates as far back as religions themselves. Sleep preaching only seems to occur as a result of social stimulus that inspires the preacher. Sleep preachers tend to forget what they do or say during trance. For instance, they do not feel pain while preaching. They experience strong hallucinations and visions that are perceived real. Despite their condition, sleep preachers can often e.g. walk during the preaching (Tawast 2014).

TYPES OF STRESS

Interpersonal relationship stress and sleep: Out of a large group of selected employees with poor relations with their employers, 35% reported heightened fatigue, problems with sleeping, irritableness and digestive problems, among others. Among those with good relations with their employer, the same figure was 14% (Bolinder & Ohlström 1971).

Keeping a bedmate awake and staying awake oneself: Based on several studies, the following main categories behind sleeping disorders have been identified: 1) Slight differences in body temperatures and temperature needs 2) Different circadian rhythms 3) Sleeping positions, in which e.g.

breath odour becomes a problem 4) The brain interprets something new as threatening 5) Various bodily movements 6) Use of electronics 7) Sounds made by a bedmate (Reed et al. 2019).

Sleep apnea: Sleep apnea, a common reason behind sleeping problems, became widely recognized only as late as the 1970s. It is defined by a relaxation of the throat muscles while falling asleep that is thorough enough to partially obstruct respiratory tracts. This obstruction wakes the person up, perpetuating the stressful state. This definition is based on tests made at clinics and laboratories (Guilleminault & Dement 1978).

Snoring: Exhibiting more than ten pauses in breathing per hour has been proven to be a sufficient threshold for causality with weakened memory and feelings of continuous fatigue throughout the day. This is also due to the snoring person waking themselves up and subsequently forgetting about it (Partinen et al. 1988).

Nightly grinding of teeth (bruxism): Based on several studies, bruxism appears to always be related to a larger overall state of stress. In Europe, roughly 10% of working-age people suffer from this disorder (Ahlberg 2008).

Tinnitus: Out of a group of North-Swedish people over the age of 70, 28% of women with tinnitus had noticeable sleeping problems, while the same figure for men was 14% (Asplund 2003).

Nocturnal myoclonus: Nocturnal myoclonus refers to involuntary movements at night, in which individual muscle groups contract suddenly and strongly for a brief time. This can be observed as quick spasms of the limbs. Based on the present study's analysis, the causes and treatments for nocturnal myoclonus are similar to those of more general sleeping disorders. However, a definite group of reasons could not be identified for the disorder. Nocturnal myoclonus affects roughly 3% of people (Markkula & Lamusuo 2017).

Situations where sleep deprivation occurs: Stress caused by sleep deprivation can be alleviated by getting plenty of sleep before this type of period begins. This thesis is backed a study in which volunteers were randomly assigned to two groups: group A slept for ten hours each night for a week, and group B slept noticeably less, but what to them was a normal amount. During the study period, all volunteers slept for only three hours each night for a week, followed by a four-day period of eight hours of sleep each night. All volunteers were monitored with specific methods. According to the results, volunteers in group A were much more energetic and attentive during the subsequent period of stress, and also recovered better from sleep deprivation (Rupp 2008).

The effects of night work on sleep disorders: A group of police had the following work schedule: six evening shifts, two days off, six morning shifts, two days off, six night shifts and two days off. When the schedule was changed so that evening shifts were followed by night shifts, the employees' sleeping problems were significantly reduced in the span of a year (Czeisler 1988).

The amount of light and sleep: Children born in the summer tend to wake up during sleep less than babies born in the winter (Himanen et al. 2020).

Nightmares: Nightmares can be categorized as follows: 1) Experience of intrusion: it feels like there is an intruder where one sleeps. 2) Incubus experiences: a paralyzing experience that feels like a weight on top of a person. 3) Waking up to a delusion, wherein one feels like the bed is rocking, floating or falling. 4) An uncomfortable feeling of awakensness, in which one observes themselves from the outside (Pagel & Kwiatkowski 2010). A course on nightmares was held with focus on the following topics: how nightmares are learned unconsciously, un-learning them by sharing them with a group or by writing them on paper, and by seeking better content for dreams. The following arrangements were then made: participants who had experienced rape and were having nightmares were randomly

assigned to a study group for three sessions, and a one-on-one discussion group who also took medication, as was the standard procedure. These groups were followed for six months, after which the study group was observed to have reached much better results in reducing weekly reoccurring nightmares compared to the other group (Krakow et al. 2001).

DISAPPOINTMENTS / EXPERIENCES OF PUNISHMENT

Sleeplessness related to complaints or disappointments experienced during the day: A person undergoing psychotherapy who realises they have been behaving incorrectly for no reason may experience a feeling of punishment that affects their ability to sleep (Espie 1991). The scent of a rose in one's sleeping environment can be a significant factor in causing nocturnal nightmare experiences. A study on the topic was conducted in the University of Hiroshima, in which people who often have nightmares slept in laboratory conditions. During REM sleep, the scent of a rose was sprayed into the room for ten seconds. After some time, the participants were woken up and asked to describe their dreams. Those who recognized the scent of a rose experienced the worst nightmares. The link was thought to be caused by the close proximity of the parts of the brain that process scents and negative emotions, such as fear, respectively. A familiar scent provides the strongest experience, which is why the brain can recognize it even during sleep (Okabe et al. 2020). A study on so-called REM sleep and parts of the brain, including the parietal crust layer, the precuneus and the hypothalamus regions, found that people can have several local dysfunctional sleep triggers instead of just one. These may involve daytime experiences and their alignment can be disrupted. The study provides guidance for combining medicinal and non-medicinal treatment (Buysse et al. 2011).

Irritableness after waking up: According to the multi-study analysis, waking up takes roughly 15–60 minutes. To many people, this period can be frustrating or irritating. The phenomenon has been named sleep inertia. It can have negative effects even after a well-slept night and a sufficient amount of sleep, if one happens to wake up during an unfavourable part of their sleep cycle. When subjects in a study were woken up after a period of sleep lasting 20, 50 or 80 minutes and their cognitive performance was then tested, their performance had weakened the most after around 50 minutes of sleep. At this point, the test subjects had fallen deeply asleep and were still at this part of their sleep cycle. A sleep cycle is typically around 90 minutes long and consists of sleep states; light sleep (S1 and S2), deep sleep (S3 and S4) and REM sleep (S5) (Tassi & Muzet 2000).

Sleep and electronic books: Reading an electronic book before going to bed exposes one to light that affects the ability to sleep. This argument is based on the following test: test subjects (N=12), who at home had been sleeping between 10 PM–6 AM for three weeks, took turns reading an electronic book and a regular one in the laboratory. The room was dimly lit in both situations. The subjects' falling to sleep, sleeping and the following day's feelings of fatigue were monitored. Their melatonin levels were tracked with blood samples. The following observations were subsequently made: When the subjects read an electronic book, their falling to sleep, energy levels in the morning, amount of REM sleep and production of melatonin were worse than when they read a regular book (Chang et al. 2014).

Delirium tremens / blue horrors: During delirium tremens, one might imagine a large, scary spider crawling on the wall, for instance. Based on multiple studies, it is difficult to say whether the person experiencing delirium tremens is actually asleep. The experience is almost always related to alcohol abuse or a guilty conscience (Cohen & Zadra 2016).

FEELINGS OF LOSS

Losses related to difficulties reaching full energy levels after waking up: A study on New York culture identified seven daily habits with strong correlation to irritable tiredness after waking up in the morning: 1) using a phone after going to bed 2) using electronic fitness monitoring devices while going to bed 3) watching or listening to a TV or radio broadcast before going to bed that makes one think, energises or otherwise keeps the senses active 4) heavy exercise before bedtime 5) not spending enough time outdoors 6) going to bed slightly thirsty without noticing 7) showering in the evening instead of morning (Brabaw 2016).

Enuresis or encopresis nocturne: The following arguments can be made based on several studies: Soiling the bed during sleep is strongly linked to genetics, as the person's body does usually not produce enough antidiuretic hormone. Scientific opinions are also unanimous in classifying the condition as a disease when it occurs past the age of five. What is significant is that the disorder disturbs the entire family's sleep. A functional treatment for the disorder is learning-theory therapy (Von Gontard et al. 2011).

Anaesthesia sleep: Evidence gathered from multiple studies suggests the following: roughly 10–60% of patients have dreams under anaesthesia. Dreams have most often been reported when using propofol. Dreaming is linked to light anaesthesia. Dreaming occurs during the recovery stage, not during the anaesthesia itself (Mäkelä 2010).

Hypersomnia as a disorder: The *Kleine-Levin syndrome* (KLS) appears as periodical hypersomnia among periods of normal levels of awakesness. During periods of hypersomnia, the patient may sleep for 18 hours a day. Kleine-Levin syndrome (KLS) refers to periodic hypersomnia among periods of normal levels of awakesness. During periods of hypersomnia, the patient may sleep for 18 hours a day. There is no known cause of KLS, but it may occasionally be linked to limbic encephalitis or a virus (Chauvot de Beauchêne 1786). Every 2–3 out of 10,000 adults suffer from *narcolepsy or cataplexy* (*loss of voluntary muscle tone*). The disease may already appear during childhood, but typically begins in stages during youth or young adulthood. Its first symptoms include fatigue and proneness to falling asleep. Other symptoms appear in stages throughout the following years. Fully developed narcolepsy is incurable, but does not affect a person's life expectancy. It can be very detrimental to daily life, especially if the symptoms are severe. Compulsive falling asleep and cataplexy are linked to an elevated risk of accidents. According to current knowledge, the symptoms are caused by the weakened function of one of the brain's neurotransmitters, the orexin/hypocretin system (Kallweit et al. 2018). The following is known based on several studies: the human African sleeping sickness, or trypanosomiasis, is a disease caused by the parasites *Trypanosoma brucei gambiense* and *Trypanosoma brucei rhodesiense*, both of which spread along with tsetse flies (Rudenko 2011).

Infections and sleeping problems: There is a correlation among men between mild infections and sleeping disorders related to depression and anxiety. Among women, a similar link is only evidenced in perimenopausal and postmenopausal women, who are not undergoing hormonal replacement treatment or using orally administered contraceptives. These results are based on a study on a birth cohort from Northern Finland from 1966, as well as data from the Finnish city of Pieksämäki. Low-level infections were gauged based on the concentration of sensitive C-reactive protein (CRP). The cut-off points were 1.0 mg/l and 3.0 mg/l. Symptoms of depression, anxiety and insomnia were studied using the Hopkins Symptom Checklist 25 inventory, a 15-D questionnaire regarding sleeping problems and Beck's depression inventory (Liukkonen 2011).

Falling asleep dangerously at work: In Finland, night-time traffic accidents occur most often between 12 PM and 1 AM. There are at least twenty different categories for determining and preventing the aforementioned sleeping disorder (Partinen & Sulander 1999).

Sexual parasomnia: Sexual parasomnia refers to strange losses of consciousness during sleep, during which a person might exhibit sexually oriented speech, crude language, caressing, masturbation, sex and even violence. It is common not to remember these acts afterwards. The phenomenon was first described at the University of Toronto in the 1990s (Shapiro et al. 1996). Matters of criminal responsibility related to the problem can be judicially challenging due to the difficulty of determining losses of consciousness linked to disorders (Ingravallo et al. 2014).

THINGS TO AVOID

Fear of falling asleep: One significant cause of insomnia is a learned vicious cycle, in which one becomes afraid of sleepless nights, thus reinforcing their own sleeplessness (Mahowald. & Schenck 1992).

Misuse of sleep medication and alcohol: The following summary can be made based on several studies: People with sleeping problems and a long history of sleep medication tended to experience worse quality of sleep across all age groups in comparison to a control group of people who did not use sleep medication (Puustinen 2014). The following summary can be made based on several studies: a glass of wine or a bottle of beer can help one get to sleep, although the other effects of alcohol make it a poor choice of sleeping aid (Ebrahim et al. 2013).

The vicious cycle of sleeping too much: The following summary can be made based on several studies: The phenomenon of sleeping too much appears across all age groups. People who sleep for more than ten hours per night have a 30% higher risk of dying prematurely than people who sleep seven hours per night. (Kwok et al. 2018).

Perceived sleeplessness: There have been many cases of patients who will report having stayed up for almost the whole night, but who according to monitoring have slept for a normal amount of time. Comparing scores on anxiety and depression symptoms among people suffering from perceived insomnia, actual insomnia and people without any sleeping problems, the following observations could be made: those suffering from perceived sleeplessness were more anxious than those without sleeping problems, but also on par with those with actual insomnia. In terms of depression, those with perceived insomnia scored significantly higher than the other groups (Liao et al. 2018).

Living in dreams: The Finnish philosopher and politician Yrjö Kallinen wrote a book called *Elämmekö unessa* (“*Are we living in a dream*”) that uses case reports to explore the thesis “we are all more or less mentally ill, and each of us is more or less asleep”. This theory was later utilized in work for peace (Kallinen 1971). One study analysed the reports of both healthy controls and schizophrenia patients on their respective dreams and the contents of their waking consciousnesses, and found that schizophrenia patients’ states of consciousness were similarly abnormal across wakefulness and sleep. However, this result does not unequivocally support the theory in which dreams are considered a state of consciousness similar to psychosis (Valdas 2014).

CHANGES

Different sleeping requirements by age: A study on the circadian rhythms of people working in shifts and their families utilised data from multiple studies describing the ideal amount of sleep across various ages. The results were as follows: 0–3 mo.: 14–17 h, 4–11 mo.: 12–15 h, 2 years: 11–14 h,

3–5 years, 10–13 h, 6–13 years: 9–11 h, 14–17 years: 8–10 h, 18–25 years: 7–9 h, 26–64 years: 7–9 hours, 65+ years: 7–8 hours (Sadeghniaat-Haghighi 2020).

Learning and coming up with solutions during sleep: A theory, according to which the brain is completely iso-lated from its environment during sleep is incomplete. There appear to be repeating gaps lasting around half a second during the isolation, during which new material can be learned. This has been tested using the following setup: test subjects were told they would be tested for whether resting helps them correctly guess unfamiliar words in a foreign language they would be read after a nap. Unknown to the test subjects, however, the words were already repeated aloud while they slept. After the nap, it was also confirmed that none of the subjects heard anything during sleep. The words were not familiar to the subjects, since they were in a made-up language. Each pseudoword was paired with an actual word in the subjects' native language. Words that in preliminary testing created a familiar impression due to similarities in sound symbolism (the connection of phonemes and combinations thereof to the nature of the described word itself, such as its size or shape). Word pairs read aloud to sleeping persons included e.g. "tofer" and the native word Schlüssel (key), as well as "guga" and Elefant (elephant). The word pairs were repeated aloud four times. After the test subjects woke up, they were asked if any of the things described by the pseudowords were small enough (such as "tofer") or too big (such as "guga") to fit into a shoe box. According to the results, the test subjects had formed impressions of the words' meanings during sleep. Their answers were clearly more accurate than what would have been achieved through guesswork alone. The results were also in line with the active stages of their brains' hippocampus, which controls a person's memories. The more often the repetition of a word coincided with a half-second of activity in the brain, the stronger the impression was (Züst et al. 2019).

Jet lag: Typical symptoms of jet lag include fatigue, sleeplessness, stomach pains, memory disorders, headache, irritability and a weakening of physical and mental performance. According to several studies, on average, the amount of jet lag incurred by plane travel can be calculated in hours thusly: when flying West, the number of crossed time zones is divided by 2.5 and when flying East, the amount of crossed time zones is divided by two (Suvanto 1995).

The first-night effect: Most people sleep poorly while staying in a new place for the first time. The phenomenon has been named the "first-night effect", or FNE (Tamaki et al. 2016.)

Coregasm and sleeping: Many people experience something called coregasm during various physical exercises, or even when driving a car they like. It also has effects on sleeping well at night. EEG and similar physiological measurements have shown this phenomenon to share traits with a sexual orgasm. A coregasm can also be reached with specific coregasm exercises (Herbenick 2015).

Changes in weather and sleeping problems: According to a large follow-up study from Germany, changes in weather, cloud coverage and windiness are a significant factor for nearly half of all people suffering from sleeplessness (Denissen et al. 2008).

Lucid dreams: The first scientific examination of lucid dreams was conducted by the English researcher Keith Hearne in the 1970s (Hearne 1975). He defined **Lucid dreams** as dreams, where the person is aware of dreaming.

Treatment of sleep: Shift workers may benefit from psychological treatment of sleeplessness and intervening guidance despite their irregular work schedules. The effects vary greatly from one person to another, however. This was shown in a study of shift workers, who had been suffering from non-organ related sleep disorders for at least three months. The patients were randomly assigned between

group treatment, guided self-treatment and individual treatment. They were followed for six, twelve, and twenty-four months after the interventions had ended (Järnefelt et al. 2018).

Premonitions and telepathic dreams: Experiments have been carried out in which e.g. everyone in the audience of a rock concert stared at a specific photograph while thinking of a sleeping person. The sleeping person was then woken up, asked about the dreams they had had, and also asked to describe the photograph in question. The test subjects' dreams bore some similarities to the photo shown, but the overall results were not statistically significant (Ullman 1996). One commonality was identified in an analysis of two hundred dreams described as premonitions. According to the researchers, "dreams that are interpreted as messages can be personally meaningful, even if they go against one's world views" (Honkasalo & Koski 2017).

Sleep and hypnosis: Theories on hypnosis have traditionally been split into those regarding neural changes and those approaching the subject from the viewpoint of social psychology. Common problems with both approaches are that so far there has been no clear way to separate hypnosis from sleep, and that the so-called normal state of consciousness already involves such a large amount of different feelings and experiences, that defining something as an altered state based on subjective experience alone is extremely difficult. The fact that the dreamer cannot prove having had a specific dream already presents a problem (Oakley & Halligan 2009).

Conclusions

The research reports presented above can be easily placed within the reason categories in the 7x4 field. For instance, preventative mental healthcare work requires scientific information about the significance of sleep and the how to maintain good sleep (Partinen & Huovinen 2007). The 7x4 field is ideal for categorising this type of data. As such, the following presents scientific data from this analysis, which can be categorised as follows:

1) Lonelinesses: The feeling of tiredness is considered the primary reason for going to bed. People tend to use a mattress, pillow and a suitably heavy blanket. Most people prefer a bed that allows the spine and head to lay straight while sleeping on one side.

2) Patterns and models: People tend to get out of bed around the same time each day, including on days off. Possible naps are usually taken at specific times, and last 1.5 hours at most. The ideal nap length is 25 minutes. People use their bed and bedroom primarily for sleeping and sex life. Work, for instance, is kept separate from the bedroom environment. People do not spend much time reading or watching television in the bedroom. Sleeping naked is preferable, as are personal bedtime rituals, such as airing the room, checking the doors, brushing teeth and checking the time. A pleasant scent, such as that of a clean sheet, can promote a good night's sleep.

3) Types of stress: The bedroom should be kept calm, dust-free, suitably cool, free of draft, and dark, including during trips to the bathroom. The bedroom should be lit up brightly immediately after waking up. One should make sure there are as few things to keep an eye on during the night as possible. These include people, pets and appliances. Sleeping next to a cell phone or a snoring person is a stressful situation that one might not notice. Sexual release alone or together helps people sleep. However, couples should keep in mind that some people experience heightened energy levels after sexual intercourse.

4) Experiences of punishment and disappointment: Take into account that a peaceful mind brings the best sleep. If one is troubled, for instance, they are more keen to get up to do something relaxing

rather than lay in bed where they cannot sleep. Watching thrillers or disaster films also makes falling asleep more difficult.

5) Feelings of loss: One should take care to avoid the effects of stimulating medicine, breathing problems or heavy eating and drinking on sleeping. A light bedtime snack, such as milk and a cookie, is recommended, but sleeping immediately after waking up in the middle of the night can easily cause hunger during subsequent nights.

6) Things to avoid: One should avoid consuming coffee, tea or other stimulants before going to bed. Coffee consumed as much as six hours before bedtime can affect some people's ability to sleep. One should avoid drinking alcohol or smoking for at least two hours before going to bed.

7) Changes: One should exercise in a manner suited to them, but physical exertion should be avoided for two hours before going to bed. If one must change their circadian rhythm, they should start adjusting to it at least three days prior.

Treatment of sleeplessness typically uses either medicinal or non-medicinal approaches. Researchers Perlis, M., Shaw, P.J., Cano, G. and Espie, C.A. defined this field of problems similarly to the 7x4 field (Perlis et al. 2011). The main points of their theory are:

1) Individual disruptions in the ability to get to sleep: A system of managing sleep irritants.

2) Disruption of sleep caused by genetics: sleeplessness seems to often carry a hereditary component.

3) Combination of factors related to exposure, release and maintenance: Spielman's three-factor model (Spielman et al. 1987).

4) The effect of a heightened rhythmic irregularity of sensory processing, processing of cognitive information and long-term memory imprints: a neurobiological model.

5) The inability to control one's waking state, leading to a psychological and biological state of overstimulation: a psychobiological inhibition model.

6) A conditioned cortical state of awakeness, where a person e.g. goes to bed and their mind is detached from other activities of the day: a neurocognitive model.

7) A vicious cycle between the information about daily changes produced by the cortical and limbic system of the brain and the ventrolateral preoptic nucleus (VLPO) of the brain, which controls the state of sleep. A cage-changing model.

The following observations can be made by comparing the presented research results with the cornerstones of mental health and well-being: topics related to the model's section on interpersonal relationships consist of attitudes towards sleeping problems in one's immediate environment, sleep talking and bedtime rituals. Topics that fit under exercise and bodily functions are ASMR, diet and sleep, relaxation exercises and sleep, early morning insomnia, sleepwalking and nocturia. Topics related to rational activities are circadian rhythms and sleep, irregular bedtimes and wake-up times, and napping. Irrational activities on the other hand include beauty sleep, sleeping and sexuality, and sleep preaching. The fourfold split seems to also apply to other categories of reasons.

This study reinforces the 7x4 field theory for mental health work, which is more extensively explained in the book *7x4-field in Mental Health Work* (Heiska 2016). Its publication has been followed with articles in the *International Journal of Health and Psychology research* and *IJRDO – Journal of Social Science and Humanities Research* (Heiska 2018 and Heiska 2019). A functional field of categorisation is needed, since each year the scientific community produces such an abundance of

reports on the topic of sleep. Finnish experts on sleeping have published the following categorisation: **individual sleeping needs, attitudes towards sleeping, disrupting factors, effects on overall health, sleep deprivation, positive factors and learning** (Kannas et al. 2013). This categorisation is largely similar to the 7x4 field.

The 7x4 field presented in this publication also includes certain variables related to the cornerstones of mental health, such as sexiness–lack of sex, sleep–sleeplessness, lack of information–information overflow, or equality–jealousy/envy, in a way that allows them to be utilised in concretising the methods of preventative medicine.

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