# Gender differences in nightmares, bad dreams and sexual dreaming

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## Preface

This bachelor assignment is the end three years studying psychology at Norwegian University of Science and Technology (NTNU) in Trondheim. The theme of the assignment is sexual dreaming and nightmares, and I have chosen to focus on gender differences related to frequency of these experiences.

The project manager of this bachelor assignment was Professor Wei Wang. Torhild Anita Sørengaard has been the main supervisor of the assignment, being extremely helpful and comforting when it comes to writing, constructive critique, advice and helping to find the appropriate thesis, research question and analyses for the variables. Her availableness and clear engagement have been heavily appreciated. I would also like to thank Tiffany Lussier and Eline Eyde Lüder-Larsen for also being very helpful in their roles as scientific assistants, using a lot of time helping with the dataset and questions of all kinds from the students. The other students on this bachelor project have also been at great help with thoughts and reflections related to the theme, data collection and data analyses through weekly discussions. Beside this, the analyses and writing has been conducted individually by me.

## Abstract

This study has examined if there were gender differences in frequency of nightmare and bad dreams and sexual dreaming in a Norwegian population. Previous research has shown mixed results relating to these dreaming habits, but an overweight of research has indeed found gender differences. Three hypotheses were presented, stating that women would have more nightmares and bad dreams than men (H1), men would have more sexual dream experiences than women (H2) and women would experience more dreams in general than men (H3). A daily dreaming questionnaire was sent out for respondents ($N$=87) to answer every day during a period of four weeks. Hypotheses were analyzed in SPSS and t-tests showed no significant gender differences, meaning none of the three hypotheses were supported. H1 and H3 showed low effect sizes, while H2 showed a low to medium effect size. Sample characteristics and sample size in addition to methodological factors might have influenced this study`s results to deviate from other research results. Research on dreaming is still in need of more exploration and elaboration, and studies on gender differences related to sexual dreaming and nightmare experiences might be convenient in reaching a better understanding of gender differences in dreaming habits and mental health issues.

# Introduction

Sexual dreaming and nightmares are two phenomena in human life which long have been very mysterious and complex. When it comes to dreaming many different explanations and hypotheses have been proposed related to what dreams might mean and why we dream, ever since humans started showing interest in the subject hundreds of years ago. All the time humans spend sleeping and dreaming in their lives and the proportionally lacking knowledge related to this topic offer heavy arguments of why more research is needed to help understand the mystery of dreaming. Gender differences related to dreaming habits like nightmares, bad dreams and sexual dreams are also in need of elaboration, due to previously results illuminating differences regarding this.

A dream can be highly vivid, with clear colors, sounds and sometimes perceptions of pain and pleasure or tactile and olfactory stimulations, but dreams can also be very vague (Hobson, 1988; Nir & Tononi, 2010). Nonetheless they are all created solely by the brain without any direct external stimuli. Sexual dreams, nightmares and dreaming in general typically occur during rapid eye movement (REM) sleep, but it can occur during non-REM sleep as well (Nir & Tononi, 2010; Siclari et al., 2018). REM sleep is one of the four periods of sleeping, and the REM sleep is amongst other characterized of an elevated level of brain activity (Peever & Fuller, 2016; Solms, 2000). Elevated activity in the limbic and paralimbic structures, like the amygdala and the anterior cingulate cortex, is also observed during REM sleep (Maquet et al., 1996). This activation may provide a biological explanation behind the strong emotions dreams have the ability to activate. The three other stages of sleep (N1, N2 and N3) are characterized by non-rapid eye movement (NREM) sleep, and as one sleeps, the person will experience these four stages in circadian rhythms (Solms, 2000). The duration av the REM sleep periods in the sleeping rhythm progressively increases, although the second stage (N2) is dominating the whole sleeping-process, being predominant 50% of the time (Patel; et al., 2021). When researched upon, many have found gender differences between men and women´s dreaming habits, and more specifically when it comes to habits of sexual dreaming and nightmares (Levin, 1994; Schredl et al., 2009; Schredl et al., 2019; M. Schredl & I. Reinhard, 2011; Yu, 2008). Women seem to have more nightmares than men and men to have more sexual dreams than women. Women also seem to report more dreams in general than men (Giambra et al., 1996; Hmidan & Weaver, 2019; Schredl et al., 1998).

### *Sexual dreams*

Sexual dreams are nocturnal dreams with a pornographic or erotic content. Sexual dreams can include kissing, vaginal intercourse, anal intercourse, sexual thoughts and fantasies, petting, as well as content of a more negative sort, such as rape or aggression (King et al., 2009). One can distinguish "sexual dreams" from "sex dreams", the latter meaning a sexual dream resulting in an orgasm or emission (Kinsey et al., 1998). Egyptian women reported feeling pleasure and elevated sexual arousal up to several days after having a sexual dream (Younis et al., 2017), illustrating how having a sexual dream may have a significant impact on people´s everyday lives. A study by Schredl et al. found that 85.6% of the women and 92.7% of the men in a German sample had at least once experienced a sexual dream (2004). In a Canadian sample of university students, 36% reported having a sexual dream once a week (Zadra et al., 2003). Other studies of Canadian and Chinese students have shown that around 70% to 90% of people have once or more in their lifespan experienced a sexual dream (Schredl et al., 2009; Schredl et al., 2019; Yu, 2008; Zadra et al., 2003), making it a known and occurrent phenomena for many. Notwithstanding this regularity, studies on sexual dreaming are few and a subject in need of further examination. Although there exist studies that find no significant gender differences (Hmidan & Weaver, 2019; Zadra, 2007) and a study finding women having more dreams with sexual content (Rainville & Rush, 2009), there is a general assumption with underpinning evidence that men have a higher frequency of sexual dreams than women (Schredl et al., 2009; Schredl et al., 2019; Schredl et al., 1998; Yu, 2008). The reason behind this gender difference has nevertheless not yet been investigated thoroughly enough and there are still many questions with enlightening answers that remain unclear and unresolved.

### *Nightmares*

Nightmares are defined as "extended, extremely dysphoric dreams that usually involve efforts to avoid threats to survival, security, or physical integrity" and the dreamer will usually wake up suddenly from the nightmare and be fully conscious of his or her environment (Cappadona et al., 2021). Nilsen and Levin distinguishes nightmare-related dreams between three different categories, which are ideographic nightmares, post-traumatic nightmares and sleep terrors (2007). Post-traumatic nightmares are more stressful types of nightmares experienced more frequently. They are often related to experienced traumas and post-traumatic stress disorder (PTSD), although the relation to this psychopathology is not necessary. Sleep terrors are in comparison less vivid and comprehensive then post-traumatic and ideographic nightmares, and do not result in awakenings with clear dream recall from REM sleep. In fact, sleep terrors

rather occur in NREM sleep. The last category, ideographic nightmares, are, like post-traumatic nightmares, experienced during REM sleep, but has no known or specific cause. Nilsen and Levin`s presentation of three different types av nightmares illustrates one central problem related to nightmare studies. The subject "nightmares" lacks a consistent definition, where many researchers leave it up to study participants to define when to report a nightmare and not. For example, Levin (1994) defines a nightmare as "a vivid and terrifying nocturnal episode in which the dreamer is abruptly awakened from sleep", while Wood and Bootzin (1990) defines it more broadly as a "frightening dream, usually occurring during REM sleep". Nevertheless, the waking up component of the nightmare definition is often used by many to distinguish nightmares from other bad dreams (A. Zadra & D. Donderi, 2000). There exists an assumption that nightmares are more intense than bad dreams, although there is important to mention that a bad dream that does not waken the sleeper can be experienced just as fearful and intense as a nightmare (Zadra et al., 2006). In this study, nightmares and bad dreams will both be included as the same variable, but the concept of "nightmare" will be playing the main part of the introduction and discussion.

When it comes to prevalence of nightmares, there are a lot of different studies showing similar results. A study by Levin (1994) found that approximately 4% of college students ($N$ = 3433) in New York experience weekly nightmares, 83% of the subjects reported having experienced a nightmare withing the last year, while 17% reported never having experienced a nightmare. Zadra & Donderi (2000) found an annual mean of experiencing both nightmares and bad dreams of 40.44. Belicki (1992) found a mean of 0.83 nightmare experiences per month, while another study of university students ($N$ = 841) has reported results where 76% of the sample reported having at least one nightmare the previous year, 69 of these reporting monthly nightmares that year (Belicki & Belicki, 1986). Experiencing nightmares once a month can be regarded as "frequent nightmares", although other studies regard "frequent nightmares" as once per week (Hersen, 1972). Other studies show that 2-5% of the general population of countries like Norway, Germany, China and Finland experience weekly nightmares, although there has not been many general population sampled studies regarding nightmare frequency (Sandman et al., 2013). Nevertheless, results like these show how relevant nightmares might be in people`s lives.

There is clear and consistent evidence that there exists a gender difference in nightmare prevalence, where women report more nightmare experiences than men (Abdel-Khalek, 2006; Sandman et al., 2013). The reason behind this difference is somewhat less clear, and there are proposed several explanations for this difference. One is fronted by Schredl and Reinhard

(2011), who hypothesize that higher nightmare experience frequency amongst women can be attributed to the fact that women have a small, but substantially higher dream recall frequency in general (Schredl & Reinhard, 2008; Schredl et al., 1998). Another finding shows correlations between negative pre-sleep mood and higher dream recall (Schredl & Reinhard, 2010), which can be related to women in general being more emotional reactive to negative stimuli and stress than men (Hantsoo et al., 2013). Women also have higher prevalence of psychopathologies related to higher frequency of nightmares, such as depression and anxiety (Salk et al., 2017; Seedat et al., 2009), insomnia (Zeng et al., 2020; Zhang & Wing, 2006) and post-traumatic stress disorder (PTSD) (Hu, 2017; Nemeroff et al., 2006). Women also report experiencing more post-traumatic nightmares than men (Nielsen & Levin, 2007). This relation to psychopathology is unclear whether is a comorbidity, correlation or causality, but the fact that there exists a relation is interesting to investigate as an explanation for the gender differences. An additional explanation is represented by Levin and Nielsen, who suggest that nightmares are related to emotional processing and coping style that could be reflected in dreams, which again can be related to gender differences (2007). This also leads to a hypothesis that experiencing nightmares can be connected to general personality style (Nielsen & Levin, 2007).

Implications for experiencing frequent nightmares have been investigated by Levin (1994). People experiencing this seem to have poorer sleep quality, have grater dream recall, be more affected by their dreams and nightmares and they report more aggression and aggression-related intensity in their dreams compared to non-frequent nightmare experiencers (Levin, 1994). In Levin`s study, controls were twice as likely than the nightmare-group to report happy dreams, and they used significantly fewer negative words when asked to give dream descriptions of their common dreams. Consistent with research by Nemeroff et al. (2006), Zhang & Wing (2007), Seedat et al. (2009) and Li et al. (2010), Levin found correlations between experiencing frequent nightmares and a greater disposition for psychopathology (Levin, 1994), perhaps leading to a downward spiral where nightmares lead to psychopathology and vice versa. Understanding the potential gender differences in the experience of nightmare frequency might be helpful in getting a deeper understanding of gender differences in mental health.

There is evidence showing that the nightmare-prevalence in women is highest for adolescents, peaking in the age group 20-29 years old and decreasing with increasing age (Nielsen et al., 2006). In the same study, the prevalence for men was closer to stable, indicating that the gender differences also would be peaking in a younger age. The elderly age group, age 60-99,

reports the lowest nightmare frequency and also low probability of experiencing problems with their nightmares (Salvio et al., 1992). Some studies find no gender difference related to nightmare prevalence in children and elderly, rather seeing that the gender difference starts in adolescence and decreases with age (Michael Schredl & Iris Reinhard, 2011).

### *Continuity hypothesis and alternative dreaming etiologies*

Many explanations of why, how and what we dream of have been proposed by different traditions in the biological and psychological domain. One of the more familiar and supported hypotheses related to dreaming is the continuity hypothesis. The continuity hypothesis states that dreaming is continuous with waking life and that people will manifest in their dreams their concerns and preoccupations of their waking life (Hall et al., 1982; Schredl, 2003). Belief in this hypothesis makes investigating relations between everyday life and thought and dreaming content very interesting, although there are many insecurities relating to this hypothesis that are difficult to find stable answers to. Dreaming studies in general are not always easy to conduct, partly because people tend to forget their dreams in retrospective and diary procedures, but also because biological and neurological procedures, such as sleep laboratory studies, are costly and demand a lot of time and resources from both participants and researchers. Some dreaming models, like the neurocognitive model (Domhoff, 2003; Foulkes, 2014) and the Activation-Input-Modulation model (Hobson et al., 2000) reject that dreams have a direct relation to everyday life (Nir & Tononi, 2010), while other models accept that memories sometimes are incorporated into dreams even though they do not accurately represent everyday life experiences. For instance, Domhoff (2003) argues that content analyses have shown a strong relation between waking life and content of dreaming, even so this correlation might not necessarily have a functional or meaningful character. Some arguments for the continuity hypothesis are found looking at different types of content in dreaming habits (Zanasi et al., 2012). An example is studies showing that men`s sexual dreams are more influenced by aggressiveness (Rainville & Rush, 2009), while women`s sexual dreams are more dominated by romance and gentleness in comparison to men (Chen et al., 2015). This supports the continuity hypothesis since men seem to be a little more aggressive than women in general (Bettencourt & Miller, 1996; Im et al., 2018), and women are in general are perceived as gentler and more romantic compared to men. Chen and colleagues (2014) found in a study that women significantly experience more negative emotions and try to give more meaning and interpretations to nightmares than men, supporting some of the results from Levin`s study (1994). Research has shown that personally meaningful information and information with a negative value often are better remembered

(Kensinger, 2009; Skinner & Price, 2019). The weight women seem to place on nightmares through meaning interpretation and experiencing negative affect might be factors contributing to women experiencing or remembering more nightmares.

### *Possible explanations of gender differences related to sexual dreams*

The frequency of sexual dreaming have of some scientists found to be related to waking time spent *thinking* about sexual fantasies, while time spent with sexual intercourse or masturbation seem to have a weaker relation with frequency of sexual dreaming (Schredl et al., 2009). This result gives some support to the continuity hypothesis of dreaming. Still, Schredl and his colleagues conclude that although men seem to have a higher frequency of sexual dreaming than women, and men in fact have the highest sexual fantasy frequency (Leitenberg & Henning, 1995), this is not all due to time spent thinking about sexual fantasies, and they believe other elements may also come into play.

Some studies show that sexual fantasies are most frequent in younger adults, both for men and women, and decrease with age (Giambra, 1974; Leitenberg & Henning, 1995; Zimmer et al., 1983), just like sexual dreams are most frequent for younger adults (Schredl et al., 2019). If more studies demonstrate the same age-decreasing pattern for sexual dreaming, with highest occurrence of sexual dreaming in the youngest adults, then this would also be in support of the continuity hypothesis.

Other researchers have found gender differences when it comes to correlations between sexual interactions in dream content and daytime variables. Daytime variables included total sexual experience, total orgasmic experience and number of sexual partners. Results from a study of King and colleagues showed moderate correlations for men, but no significant correlations for women (2009) when investigating relationships between daytime variables and sexual dream content. King et al. also found gender differences when it comes to relationship between daytime fantasy and daytime sexual activity, where there is a significant relation between these for women, but not for men. Perspectives and research findings like this have lead Wilson (1992) to a hypothesis that sexual fantasy is more often a result of sexual frustration for men than sexual satisfaction, which seems not to be the case for women. This gives an alternative explanation to the continuity hypothesis. Research results like these illustrate the importance of examining gender differences when it comes to sexual dreaming and the need for better explanations for these differences.

Frequency of sexual dreaming have shown different correlations with a variety of factors. Younis` study of Egyptian women found that prevalence of a sexual dream was highest in women aged 20 to 29 years, in women with a university degree and in house wives (Younis et

al., 2017). They also found a proportional relationship between sexual intercourse frequency and orgasm frequency, and frequency of sexual dreaming, a result contradicting Schredl et al.`s study where they found no significant correlation between daily sexual intercourse or masturbation and sexual dreaming (Schredl et al., 2009). In Younis et al.`s research, the variable "thinking about sex and sexual fantasies" was indeed not included, which might be an explanation of the different results when comparing these studies. The Egyptian women also reported that being in a sexual situation during waking life was the most important drive to having a sexual dream (Younis et al., 2017), a result building up under the continuity hypothesis. In addition, there is evidence that men have more sexual intercourse and masturbate more than women (Oliver & Hyde, 1993), which could be seen as a support of the continuity hypothesis since men experience more sexual dreams. Contradicting results like King et al.`s research and Younis` and Oliver & Hyde`s research also illuminate the importance of investing differences in sexual dreaming habits.

### *Possible explanations of gender differences related to nightmares and bad dreams*

Research supporting the continuity hypothesis related to nightmares is amongst other presented by Chen et al. (2014). They found that women usually experience higher emotional distress in and after having nightmares than men. This can be seen in association with a gender difference related to the experience of emotional intensity in everyday life, where women also report higher emotional intensity in general (Grossman & Wood, 1993). This correlation can also be used as support for the continuity hypothesis. Another study with results supporting the continuity hypothesis is one of Wood and colleagues (Wood et al., 1992), where they found that the nightmare prevalence of college students living in San Francisco close to the 1989 San Francisco earthquake was at a twofold increase compared to a control group living in Arizona. This might show that what one experiences in everyday life can have an influence on nightmare frequency. A further examination showed that 40% of the students living in San Francisco reported at least one nightmare including an earthquake, which was significantly higher than the Arizona-students whereas only 5% had experienced an earthquake-related nightmare (Wood et al., 1992), supporting continuity between life experiences and dreaming content.

Another aspect of the continuity hypothesis regards how the emotions experienced in nightmares affect a person`s emotional experiences the day after a nightmare. Studies have shown that negative emotions during a nightmare or bad dream are more likely to influence a person`s day time emotions the day after than a dream predominated by positive emotions (Schredl & Reinhard, 2010). They also found a second-order effect, showing that activities of

one day could influence emotions during subsequent dreaming which in turn could influence emotions experienced the following day. This finding might contribute to illustrate how the continuity hypothesis really works, but it also sheds light on how dreams and nightmares may influence everyday life and therefor how important it is to understand mechanisms behind these topics and relations.

### *Objective*

The main objective with this study is to examine if a sample of men and women differ in their prevalence of nightmare and bad dreams and sexual dreams. A gender comparison of dreaming frequency will also be included. Another goal of the study and this thesis is to present suggestions of explanations of potential gender differences or other results. Comparisons with other studies might help to illustrate a broader and more precise picture of people`s dreaming habits. A further examination of these themes might also help giving more developed answers to if and potentially why there are gender differences in sexual dreaming activities and nightmares and bad dreams. The research question chosen to be in focus in this thesis is "*Is there a gender difference in frequency of experiencing sexual dreams and nightmares and bad dreams?*".

Based on former research findings, partly presented in the introduction, three hypotheses are presented in this study:

H1: Women will experience more nightmares than men.

H2: Men will experience more sexual dreams than women.

H3: Women will experience more dreams than men.

## Method

### *Ethics*

The research project applied for and got ethical approval from NSD, with 637636 as notification form number. The consent from the participants was given on a daily basis each time the participants filled out the daily dreaming questionnaire.

### *Sample*

The dreaming study project, leaded by professor of psychology by the Norwegian University for Science and Technology, Wei Wang, began with a recruitment process aiming to use a convenient sample. The baseline sample ($N$ = 87) consisted of 40 men (46%, $M$ = 30.48, $SD$ = 14.06) and 47 women (53%, $M$ = 28.20, $SD$ = 12.75), with an age ranging from 20 to 78 ($M$ = 29.27, $SD$ = 12.75). The students on board with the project recruited volunteers from friends and family by asking the potential participants to sign up by e-mail. The study aimed to gather

knowledge regarding the general population, meaning there was no age or nationality limits to participate, except from an 18-year-old age limit. This was done a week before the project initially was going to start in January/February 2022. Some of the students on board sent out private messages or talked directly to potential participants, others posted a link to the sign-up-page on different social media platforms, e.g., Facebook. The idea behind initially asking potential participants for nothing more than just signing up with email was to make it more appealing and easier to participate. Before signing up, the participants were briefly informed about the goals and basic frames of the project, for instance the length of the project period, which was for a four-week period, and that it would be conducted as a daily online survey. Information about the sample`s psychiatric problems, diagnoses or mental illness was not included in the study.

### *Procedure and research design*

The project was initially aiming to begin the first of February 2022 but was delayed until the 11th of March 2022. The postponement was due to a need for ethical approval from the Norwegian Center for Research Data (NSD), which we needed approval from because of gathering of personal information. There were some of the questions we had to reformulate or exclude, because they could risk being too sensitive regarding person security and privacy. We could not include any information about the participants regarding health data, which for instance lead to a reformulation of "insomnia" to "poor sleep". Another reason for the delay was that we needed to include more participant-directed information about the project and more detailed information to NSD about the conduction of the project. An objective of the project was initially to include a depression scale, but this had to excluded due to lack of time resources.

Friday the 11th of March the participants received their first questionnaire, and they were informed that the first questionnaire was slightly longer, due to collection of demographic details, compared to the remaining days of data collection. Details like age, sex, general sexual satisfaction and relationship status were included in the initial questionnaire (see appendix 2). The participants were also asked to choose a username comprising of random letters and numbers in order to be anonymous when writing down their personal dreaming details. Every time they filled out a new daily questionnaire, they had to use their chosen username, in order for the project managers to be able to connect the answers from the same participant together. The standard questionnaire was sent as another link in the same mail, with an instruction to be filled out every day except the first (on which the participants were to fill out the initial questionnaire). Filling out the questionnaire was supposed to take from 1-

10 minutes, depending on the participant`s dream-experience, and they were recommended to fill it out right after awakening to remember as much as possible of the dream experience. What the questionnaires included will be described and elaborated on further under "Measurement instruments". After the participants filled out each daily questionnaire during the study, it was sent directly back through the online survey page, giving only the project manager admission to the data. The data collection ended the 6th of April 2022.

### *Measurement instruments*

The measurement instruments that were used in this study was a daily dreaming questionnaire developed exclusively for this study (appendix 3), the Sexual Dream Experience Questionnaire (SDEQ) (Chen et al., 2015) and the Nightmare Experience Questionnaire (NEQ) (Chen et al., 2014). The NEQ and SDEQ were both first developed in Chinese, translated to English and again translated from English to Norwegian by the students and assistants on board with the research project. A change that was made in the translation was that the questions were converted to regard the dream or nightmare a specific night, while the Chinese questionnaires were directed toward the respondent`s general experiences of dreams and nightmares. The process of translation and the changes that were done might have made the new questionnaires deviate to an extent where a new validation would be needed to proceed with the questionnaires in further and more comprehensive research projects. Participants could choose themselves if they wanted to fill out the questionnaires in English or Norwegian. The English version was a new translation from the Norwegian version, in order to make the questionnaires as similar as possible for both languages. The participants were going to fill out the dreaming questionnaire on a daily basis, and only if they had experienced a nightmare or a sexual dream that night was the NEQ or the SDEQ included in that day`s questionnaire.

### *Nightmare Experience Questionnaire (NEQ)*

The Nightmare Experience Questionnaire (appendix 4) is a questionnaire developed through a process of exploratory and confirmatory factor analysis measuring nightmare frequency and experiences related to nightmares. Chen and colleagues (2014) initially used a matrix of 95 items to measure different aspects of content and feelings related to nightmare experiences of Chinese university students. The factor analysis produced four factors, which were Physical Effect, Horrible Stimulation, Negative Emotion and Meaning Interpretation, resulting in a 20-item questionnaire. Items were answered using a five-point Likert rating scale (1 = *very unlike me*, 2 = *moderately unlike me*, 3 = *somewhat like and unlike me*, 4 = *moderately like me*, 5 =

*very like me*). Examples of items are "I feel getting weak physically because of having nightmares" and "Nightmares contain some important information which I am very cautious about".

### *Sexual Dream Experience Questionnaire (SDEQ)*

The Sexual Dream Experience Questionnaire (SDEQ) measures sexual dreaming frequency and different aspects of sexual dreaming. The questionnaire was developed using a factor analysis, starting off with 112 items related to sexual dreaming, resulting in four factors (joyfulness, aversion, familiarity and bizarreness). Like the NEQ, the SDEQ consists of 20 items with five items associated respectively with the four factors. A five-point Likert scale (1 = *very unlike me*, 2 = *moderately unlike me*, 3 = *somewhat like and unlike me*, 4 = *moderately like me*, 5 = *very like me*) was utilized when answering the 20 items. Examples of items are "I begin to hate myself because of having sexual dreams" and "I sometimes hope to immerse myself in a sexual dream and never wake up".

### *Daily dreaming questionnaire*

The daily dreaming questionnaire was developed exclusively for the study and was going to be answered every day. This daily questionnaire consisted of 13 items, measuring dreaming activities (e.g. "how many hours did you sleep last night", "did you dream last night" and "how close was your dream to reality?"), weather condition the previous day, alcohol consumption, mood, when food last was consumed and before-bed-time activities ("*exercise/stretching", "sexual stimulation", "TV/telephone", "reading a book", "thinking"* and "*other*"). If the participants answered "yes" to having a nightmare or sexual dream, they were redirected to answer the SDEQ or the NEQ.

### *Statistical procedures*

Statistical analyses were conducted using IBM SPSS statistics for Windows, version 27.0. Descriptive statistics related to gender and age were analyzed. An independent sample *t* test was applied to measure the group differences in frequency between the genders for the nightmare frequency (H1), sexual dreaming frequency (H2) and general dream frequency (H3). To show effect size, Cohen`s d was calculated for the evaluation of the effect size, with a consideration of .20 as small, .50 as medium and those over .80 as large (Cohen, 2013). A *p*-value of $<.05$ was considered to be significant.

## Results

Table 1 shows descriptive statistics and frequency statistics related to general dream, nightmare and sexual dream experience. In total for both men and women, 120 nightmares

were experienced, *M* = 1.74, *SD* =1.96, 35 sexual dreams, *M* = 0.50, *SD* = 0.81, and 534 dreams in general, *M* = 7.97, *SD* = 6.42. 63 people had at least one dreaming experience during the four weeks of data collection.

**Table 1**

*Frequency statistics related to nightmare and bad dream, sexual dream and dream experiences (*N = *87).*

| | | At least one dream experience[b] | Frequency | *M* | *SD* |
|---|---|---|---|---|---|
| Women | Nightmares and bad dreams | 27 | 73 | 2.03 | 2.10 |
| | Sexual dreams | 12 | 18 | 0.50 | 0.88 |
| | Dreams[a] | 32 | 280 | 8.24 | 6.28 |
| Men | Nightmares and bad dreams | 21 | 47 | 1.42 | 1.77 |
| | Sexual dreams | 12 | 17 | 0.50 | 0.75 |
| | Dreams[a] | 31 | 254 | 7.70 | 6.64 |
| Total | Nightmares and bad dreams | 48 | 120 | 1.74 | 1.96 |
| | Sexual dreams | 43 | 35 | 0.50 | 0.81 |
| | Dreams[a] | 63 | 534 | 7.97 | 6.42 |

Notes: [a] = Participants answering “yes” to “Did you dream last night?”. Includes both nightmares, bad dreams, ordinary dreams and sexual dreams. [b] = Frequency of experiencing at least one dream

To test if women had more nightmares than men (H1), an independent t-test was conducted, $t(68) = 1.28$, $\Delta M = 0.60$, $p = .200$, $d = .31$ (Table 2). The hypothesis was not confirmed due to a non-significant p-value, $p > .05$. Results are reported from “equal variances assumed”, because Levine’s test for Equality of Variances was none-significant (van den Berg, 2022), $p = .261$. Regarding the women, 27 (58%) experienced at least one nightmare and 9 (19%) experienced zero. 11 (23%) of the women did not answer the question. 21 (52%) of the men had at least one nightmare experience during the four weeks of data collection, 12 (30%) had none and 7 (18%) did not answer.

To test the hypothesis of men having more sexual dreams than women (H2), the same independent t-test was conducted, $t(67) = 0.00$, $\Delta M = 0.00$, $p = 1.000$, $d = .00$ (Table 2). Due to the t-value being zero, the results supported the zero hypothesis which states that there are no significant differences between the two genders in sexual dream. Results are reported from "equal variances assumed", because Levine's test for Equality of Variances was none-significant (van den Berg, 2022), $p = .863$. Of the 47 women participating, there was 12 (26%) experiencing at least one sexual dream and 24 (51%) women who not once had this experience during the four weeks of data collection. 11 (23%) women did not answer this question. In comparison, 22 (55%) men never had a sexual dream during the four weeks of data collection, while 12 (30%) men experienced at least one. 6 (15%) men did not answer. No significant difference was found when comparing frequency of men and women`s total dream experience with an independent t-test, $t(65) = 0.34$, $\Delta M = .54$, $p = .734$, $d = .08$ (Table 2). Results are reported from "equal variances assumed", because Levine's test for Equality of Variances was none significant (van den Berg, 2022), $p = .638$. 32 women (68%) and 31 men (77%) experienced at least one dream, while two women (4%) and two (5%) men never experienced any dreams during the data collection weeks. 13 (28%) women and 7 (18%) men failed to answer this question. In total, there were 6% who never recalled a dream during the month, 12% who had one dream, 8% who had a dream approximately once a week and 12% who recalled their dream more than four times a week.

**Table 2**

*Independent sample t-test (equality of means) for gender differences in experience with nightmares and bad dreams, sexual dreams and dreams in general.*

| | *t* | *df*[b] | *ΔM* | Sig. (2-tailed) | *d* |
|---|---|---|---|---|---|
| Nightmares and bad dreams | 1.28 | 68 | 0.60 | .204 | .31 |
| Sexual dreams | 0.00 | 67 | 0.00 | 1.000 | .00 |
| Dreams[a] | 0.34 | 65 | 0.54 | .734 | .08 |

Notes: [a] = Participants answering "yes" to "Did you dream last night?". Includes both nightmares, bad dreams, ordinary dreams and sexual dreams. [b] = df = degree of freedom

# Discussion

The objective of this study was to investigate gender differences in frequency of nightmares and bad dreams, sexual dreams and dreams in general. Although the study was of a longitudinal art, the variables were analyzed and used in cross-sectional way, which could have an influence on the results. The analyzes showed no significant gender differences when it came to any of these dream categories. Because of this, none of the three hypothesizes were confirmed, which are results contradicting much previous evidence (Abdel-Khalek, 2006; Giambra et al., 1996; Levin, 1994; Sandman et al., 2013; Schredl et al., 2019; Schredl & Reinhard, 2008; M. Schredl & I. Reinhard, 2011; Schredl et al., 1998; Yu, 2008). The t-tests investigating gender differences relating to sexual dreams and dreams produced low effect sizes, while a low to medium effect size was found for the gender difference related to nightmare frequency. There may be many and compound reasons for why this study`s results differ from the results from other previous studies, which are going to be discussed in the final part of this thesis.

## *Nightmare and bad dream experiences*

The t-test conducted on the data related to frequency of experienced nightmares turned out non-significant, with a low to medium effect size of .31. Although the result was non-significant, it does not mean that there exists no effect. A potential reason for the high p-value can be the small sample size (Thiese et al., 2016). The smaller the sample size, the larger the risk for random errors that can affect the sample and the research results. With a small sample size, the variability will also be of more significant effect, which in this case might be contributing to increasing the p-value to a non-significant level. These factors contribute to creating a possibility of a type 2 error and low statistical power. Because of arguments like these, there might be fruitful to look at and interpret the effect size regardless of a non-significant p-value (Di Leo & Sardanelli, 2020). By overlooking the p-value, an effect size of .31 indicate results that are more in line with previous research where small to medium effect sizes also have been found (Kelly & Daughtry, 2021; Schredl, 2014).

When comparing the prevalence of nightmare and bad dream experiences of this study`s sample with other studies, problems regarding definition of nightmare will be present. If “bad dreams and nightmares” both are included in a variable, which is the case in these analyses, then comparisons with other studies using only the “nightmare” definition might be misleading. Yet, some information may be productive to analyze. The percent of people, both men and women, experiencing nightmares and bad dreams once a month in this study is 25%.

In Belicki & Belicki (1986) the percentage of their sample having nightmares approximately once a month was 8%. In their study, the nightmare definition was much narrower, excluding "bad dreams", which might explain the big prevalence difference. Belicki (1992) found a mean of experiencing 0.83 nightmares per month in a retrospective study, with a nightmare defined as a "very disturbing dream, involving an unpleasant emotion, which is usually vividly recalled", which is a more similar definition to the "nightmare and bad dream" variable in this study. Compared to Belicki`s (1992) study, the prevalence of nightmares and bad dreams in our study is higher, highlighting the sample difference. The "bad dreams" category nevertheless might have been more available for the participants in this study, than the nightmare definition, because "bad dream" can be interpreted as milder than a nightmare, which may be an explanation for this difference. Zadra & Didori (2000) did a study similar to ours, where both bad dreams and nightmares were analyzed together. They found that 83% of the participants reported at least one bad dream or nightmare during a four-month diary study, while in this study only 55% did the same. This difference might be explained by differences in samples or motivation of filling out daily dream records in this study`s sample. Nevertheless, the problems regarding definitions in different studies show how challenging it is to compare dreaming studies with each other. This needs more attention in future studies. Additional error sources will also be presented further.

### *Sexual dream experiences*

When analyzing differences in prevalence of sexual dream experience for women and men, there was found no gender differences. This denies the second hypothesis of the study and contradicts previous studies on sexual dream frequency with a gender difference perspective (Schredl et al., 2009; Schredl et al., 2019; Schredl et al., 1998; Yu, 2008). One explanation of this could be the sample, which was indeed small. On the contrary to the gender difference in effect size relating to nightmare experience, there was found an effect size of 0, indicating no gender differences in this sample regarding sexual dreaming experience. Although much previous research have found gender differences, there are mixed results of this where for example Zadra (2007), Hmidan and Weaver (2019) and Hall and Van der Castle (1966) found no gender differences regarding sexual dreams, while Rainville and Rush found women having more sexual dreams (Rainville & Rush, 2009). The mixed results might be due to different measuring techniques and different cultural samples (Hmidan & Weaver, 2019). If the continuity hypothesis is correct, then gender differences and non-existing gender differences might be explained by differences in the cultures` attitudes, thoughts and norms towards sex and sexual dreams, or differences could be due to how inclined different cultures

are to reveal their sexual dreaming habits. An argument for this could be found in the differences in studies from 1966 and 2009, after feminist waves and sexual liberation, where women are found to have more sexual dreams in 2009 compared to 1966 (Rainville & Rush, 2009).

When looking at the prevalence of sexual dreams in this study, 6% of the respondents' dreams were reported to be a sexual dream. This is in line with other diary studies, where studies report that sexual dreaming content makes up 5-9% of dreams in total (Schredl & Göritz, 2020). Other studies (Schredl et al., 2009; Schredl et al., 2019) have in contrast found that 18% of participants` dreams were of an erotic character. These studies used a retrospective method, indicating primarily that methodology seem to have a lot to say on the results, but also that it might be easier for participants to report sexual and taboo-dreams retrospective in comparison with right after the dreaming experience (Schredl & Göritz, 2020). Another reason for this "methodological effect" might be that sexual dreams might be of a more special, meaningful or bizarre value (Williams et al., 2008), making it easier to remember after a longer time delay compared to ordinary dreams. In this study, the relatively lower reports of sexual dreams might derive from a fear of reporting sexual dreams to friends and family, because of the convenience sampling. A potential underreporting might also derive from participants simply forgetting to fill out the daily dreaming form or from participants pulling out of the study. Nevertheless, the deviating results regarding gender differences in this study might be explained by a sample who`s characteristics or reports are different than other samples, presenting an argument that the sample might be a challenger to the validity and reliability of the study and a risk of not being representable for bigger populations.

### *Dream experiences in general*

The hypothesis that there would be a gender difference in frequency of experienced dreams in favor of women was also proven wrong. When comparing the total dream frequency for both men and women with other studies, some studies have produced the same results (Ribeiro et al., 2020), while other show a higher mean of monthly dream frequency (Blagrove & Akehurst, 2000). Reasons for this might be many of the same reasons for the rejected hypotheses H1, H2 and H3, likely due to methodology and sample characteristics, which would be relevant both for this study and others. Nevertheless, because of this, the main part of the discussion on why the results came out as they did will be presented under error sources.

### *Error sources*

Some potential error sources in this research project are connected to the recruitment process. First and foremost, the fact that the participants were recruited as a convenience sample, most being the friends and family of the students on board, is relevant to criticize because it might have distorted the results of the study (Galloway, 2005). A reason for this is that the sample would be unlikely to represent a reflection of the general population (Freund et al., 2010), which was the target group under investigation. The students on board would most likely have friends and families who are relatively similar to themselves (Youyou et al., 2017), leading to a sample with little diversity in comparison with the general population. There might also exist some central age and career groups that was not included in the sample, although this is information out of reach for our analysis due to lack of career- and life situation related questions in the questionnaires. Another problem of the sample being a convenience sample is that the participants might have felt obliged to participate because they personally knew the person requesting them to, thereby choosing to participate because they felt they had to and not because they wanted to. Consequences of this may be that participants are unmotivated for completing the study. This is also relevant in an ethical way, because it could lead to participant consent that might have been unactive, unwilling or untrue for the participant and rather driven by a feeling of "having to help a friend out". In addition, participants familiar to the research managers and bachelor students might have been more likely to withhold information regarding sexual dreaming and other sensitive themes, a problem that touches upon challenges regarding social desirability (Kelly et al., 2013; Lavrakas, 2008). This is particularly relevant for the sexual dreams-reports, since this theme often is looked upon as taboo (Anderson et al., 2011; Katehakis, 2017; Vesentini et al., 2021).

Another error source related to recruitment is the self-selection effect (Braver & Bay, 1992; Khazaal et al., 2014; Sharma, 2017). This affects all research projects where consent is needed before project beginning and might therefore be very difficult to get around. Also, some of the participants have expressed that they thought they would have to experience occasional nightmares, sexual dreams or dreams to participate, thinking that they would not be of any interest in the study if they only would be giving "boring" answers if they did not rapport any dreaming activities. This type of thinking might have led many potential participants to choose not to participate, which can have led our sample to being overrepresented by people with higher-than-average experiences of dreaming activities, giving unprecise ungeneralizable results. A solution to this problem could be to not mention the theme of the study, which in this case is "sexual dreams and nightmares", until after the

participants already have shown interest to participate. Consent could still be given before the participants answer the questionnaires, but this might help minimize the danger that most of the participants are higher-than-average interested in dreams, which is not a general reflection of the general population.

A problem and potential error source that has been relevant for many previous studies (M. Schredl & I. Reinhard, 2011), is participants misinterpreting the meaning of nightmares, a misinterpretation that usually follows an absence of a nightmare definition in questionnaires. This is an error source that could both give unprecise results, because the participants have made up their own definition of nightmares and might report nightmare experiences differently due to this, as well as producing unprecise comparisons with previous studies. Another issue might reveal itself when a study has included a definition of a nightmare, but the study being compared is using another definition. An example of this is the difference in nightmare definition in the research of Wood and Bootzin (1990) and Levin (1994), as illustrated in the introduction. This might be happening due to an absence of a general accepted definition of nightmare in dreaming research. In our research, there was initially made a distinction in the questionnaire between “nightmares” and “bad dreams”, but no respective definitions were given to the participants. This could have produced a risk of misinterpretation, but this risk was not very relevant because of the combining of these two terms in our analysis of nightmare and bad dream frequency. If a similar study were to be executed, there would be productive to make a distinction of nightmares and bad dreams in the analysis, as well as including definitions for the participants in the questionnaires. Another note on the definition-problem is that this study, as many more (M. Schredl & I. Reinhard, 2011), does not include any distinction between nightmares and night terrors. This may also give unprecise results, especially in cases of meta-analyses and comparisons of different studies.

The study`s methodology is relevant to mention as a potential error source. Different studies have varying ways of measuring nightmares and sexual dreams, which can bring about problems when trying to compare and use results from one study within another. This is especially concerning research on nightmares, because of the great scope of different research on this specific topic. In diary studies like this project, where the participants fill in a daily dreaming questionnaire, the prevalence of nightmares usually turn out higher than of other methodologies, such as a retrospective technique (Levin & Fireman, 2002), with an exception of sexual dreams, like mentioned earlier, where retrospective studies produce a higher prevalence (Schredl et al., 2009; Schredl et al., 2019; Schredl & Göritz, 2020). Nevertheless, a

risk factor of inaccurate dream reporting will be memory distortion, although this would be a smaller risk in a diary study than a study using a retrospective technique. Memory often gets affected by different effects and biases, such as a tendency to remember things that have more emotional intensity or bizarreness (Williams et al., 2008), something that can affect dream reporting in addition to everyday memory. This may lead to dream reports that are inaccurate and in favor of the more bizarre dreams, while underreporting dreams of a more normal character. There may be different reasons for this, but most importantly is to be aware of such methodological differences when discussing and comparing research results.

When filling in the daily questionnaire, the participants were using their self-chosen anonymous username every day for us to be able to connect the different responds to the respective participants. Relying on the participants to fill in the same username every day might produce a risk of participants forgetting their username, which could create difficulties with analyzing the results. Another limitation is that participants might have forgotten to fill in the daily questionnaires or have fallen off the study, something that seemed to have happen in this study with a response rate of 61%, where 87 of 142 signed up answered. The participants were given an e-mail the first day with instructions of filling out the questionnaires daily, but no reminders after this. A solution to this problem could have been to send out reminders e.g., every week or every other day, or giving concrete instructions to set a daily alarm to help remember filling out the forms.

### *Implications and further research*

This research project has investigated gender differences in frequency of nightmares and bad dreams, sexual dreams and general dreams. These nightly episodes influence people`s lives in many and important ways, such as mental health, sex drive, emotions, etc., which correlations between nightmares and psychopathology (Levin, 1994) and sexual dreams and sex drive have illustrated (Younis et al., 2017). Even though the results in this study did not support the three hypotheses and contradicted results from other studies (Abdel-Khalek, 2006; Giambra et al., 1996; Levin, 1994; Sandman et al., 2013; Schredl et al., 2019; Schredl & Reinhard, 2008; M. Schredl & I. Reinhard, 2011; Schredl et al., 1998; Yu, 2008), it is an interesting study to look at methodologically. Fear of reporting taboo dreams might have played a part in reporting and recruiting familiar people might have strengthened this fear. To use a randomized sample would be a recommendation in a new, similar study. Nonetheless, there exists a possibility that gender differences regarding sexual dreams and nightmares might not be as extensive as they previously have been thought to be, or maybe the Norwegian population differs from other populations. Because of non-significant results and lack of other

studies, prevalence of nightmares and sexual dreams in a Norwegian or Scandinavian population is a field in psychological and dreaming research that remains unexplored. It would be interesting to explore a wider and more randomized Norwegian sample in order to get a better understanding of this population`s dreaming habits, and a new study should ley more weight to the relationship between dreaming and mental health.

## Conclusion

This bachelor thesis has explored the gender differences regarding frequency of general dreams, sexual dreams and nightmares and bad dreams. The statistical analyses showed no significant results. Women`s nightmare frequency did not differ significantly from men`s nightmare frequency, $t(68) = 1.28$, $\Delta M = 0.60$, $p = .200$, $d = .31$. Women`s sexual dream frequency did not differ significantly from men`s, $t(67) = 0.00$, $\Delta M = 0.00$, $p = 1.000$, $d = .00$. Men and women did not differ significantly in general dreaming frequency, $t(65) = 0.34$, $\Delta M = .54$, $p = .734$, $d = .08$. This resulted in none of the three hypotheses being supported. This does not mean that there exist no gender differences regarding these three types of dream categories, but the results may have been affected by methodological errors and sample characteristics that have distorted the research results from how dreams are experienced in real life. Studies on dreams, nightmares and sexual dreams are still in need of elaboration, and further research on gender differences regarding nightmares, sexual dreams and dreams in general might help getting a better understanding of how dreams can affect human emotions, daily lives and mental health.

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