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THE FREQUENCIES OF DREAMS AND NIGHTMARES: EXAMINING DREAM CONTENT AND ENVIRONMENTAL FACTORS

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Abstract

Factors that play into dream recollection are attitudes towards dreams, personality, visual imagination, visual memory, sleep behavior, and stress measures. Anxiety has been a pervasive issue with 18% of the adult population in the United States suffering from an anxiety disorder and only one third of those suffering receiving treatment. The present study examined the relationship between an individual's ability to remember their dreams and anxiety and sleep disturbance patterns. Participants were recruited from Mechanical Turk completed the MADRE questionnaire, The Dream Motif Scale, the National Institute of Health PROMIS Sleep Disturbance Scale, and the Beck Anxiety Inventory Scale along with demographics. Results showed there were gender differences in sleep disturbance, "Delusion" themed dreams, and nightmare frequencies. In addition, multiple analyses performed found significant correlations between other factors related to frequency and content. Previous studies have highlighted the possible factors that lead to this possible relation and are discussed.

Keywords: DREAM RECALL, ANXIETY, DREAMS, SLEEP BEHAVIOR, DREAM CONTENT

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Sincerely,

Mary Woznicki

Introduction

Dreams are known by personality theorists as a gateway to understanding human personality in attempts to also understand human behavior. The way in which psychologists approach their understanding of dreams varies, though. Generally, from a clinical perspective, dreams can assist psychologists in helping their client (Kets de Vries, 2014). From understanding a client's dreams, a therapist is better able to assist a client to address the issue(s) that the client may want to address in therapy. Disregarding such information can neglect a facet of their client's therapeutic experience that they would otherwise receive if talked about dreams. Moreover, the more information the therapist can use from a client's dreams to delve into their psyche, the more potential for improvement in the client's therapeutic experience.

However, there is a roadblock to being able to understand such a phenomenon. Dreams are only available to a client outside of their waking life state. From this perspective, this means that dreams are not within humans' domains of conscious control. For example, from a psychoanalytic perspective, dreams appear through the unconscious and reappear as desires and wishes that are not expressed in our waking moments of life (Kets de Vries, 2014). This is the particular aspect of dreams that can serve to be awkward, perplexing, and quite uncomfortable for a client. There have been multiple approaches to approaching this issue of being uncomfortable with dreams, though. Notably, the field of neuroscience has found several factors that contribute to dreams, such as "…memory, learning, creativity, and self-awareness…" (Carskadon, 1993; Moffit, Kramer, & Hoffman, 1993; Solms, 1997; Lavie, 1998).

The popular exploration into studying of dreams has led to the title of this particular domain of research – oneirology. This domain combines fields of psychology, neuroscience, and

the addition of literature (Hartmann, 1973; Bulkeley, 1997). By studying dreams from multiple perspectives, it helps those yearning to understand this phenomenon to become knowledgeable of this topic at a deeper level. With studying oneirology, we must account for other factors such as differing cultural perspectives of dreams. For example, in Ancient Babylon, Greece, and Egypt, dreams were used as a mechanism to communicate with the gods (Barrett & McNamara, 2012; Hartmann, 1973; Van de Castle, 1994). Without accounting for the rich history of dreams, it will be a disservice toward the numerous domains and professions, as dreams overlap domains beyond the field of psychology and neuroscience.

Within this realm of studying, there have been multiple explanations and interpretations as to why humans dream. Some disregard dreams as useless information and that because they do not occur in our conscious state, they are seen as irrelevant (Kets de Vries, 2014). In contrast, there is a biological perspective that believes dreams are a natural and biological function of human behavior. With the biological perspective, it is argued that dreams help humans solve crises within our mind and to help us sort out information to help us function more optimally in our awake, conscious life (Kets de Vries, 2014). From this sort of approach, supporters of this perspective argue that humans are rehearsing how they can react to life events (Hobson, 1995, 1999). Such rehearsal enables those who dream to sort through what could be potentially dangerous life situations in a more peaceful manner in our sleep. In addition, this biological perspective also credits the amyglada being stimulated when we are in our dream, or REM, sleep cycle as a way to enhance humans' behavior towards dangerous life situations (Devinsky, Morrell & Vogt, 1995). Ultimately from this argument, supporters suggest that this allows humans to build relationships amongst certain life situations that will ensure us a beneficial adaptation necessary for human survival.

From a clinical perspective, dreams can be seen as mechanisms to enhance therapy and a solution towards aiding trauma victims (Barrett, 2001a; Hartmann, 2006). Dreaming about such traumatic events, for example, is suggested to help establish an emotional stability among clients who pursue to discuss their dreams in therapy. More importantly, though, it is argued that the more frightening a dream is the more important it is for that client to "...get over it…" when dealing with their trauma in waking life (Barrett, 2001a; Hartmann, 2006). Additionally, this notion of using dreams within the therapy process has become extremely useful for psychotherapists. Psychotherapists believe that dreaming is a phenomenon that can explain human behavior in waking life which may not be in our conscious awareness (Hartmann, 1995). Also, by using a Freudian foundation, psychotherapists are able to distinguish the types of content within dreams into two domains – manifest and latent (Fonagy, Kachele, Leuzinger-Bohleber & Taylor, 2012). Manifest is the literal situation of the dream which can be described by its images, thoughts, and the context of the dream itself (Fonagy, Kachele, Leuzinger-Bohleber & Taylor, 2012). The latent content is described as a deeper-level of the psyche. Theorists such as Carl Jung have emphasized the importance of dreams as being essential to self-actualization and realization of one's self (Jung, 1966).

Both theorists argue that the more often a troublesome dream occurs, the less likely an individual has dealt with a potential threatening issue. From this perspective, this potential issue may be affecting their daily functioning because they have not addressed unresolved conflicts in their waking moments of life (Hartmann, 1995). Continually, psychoanalysts argue that it is essential to understand and address a client's dreams for this purpose. It can be even deemed neglectful and unethical if a clinician does not address the content of a client's dreams, which can in turn lay the ground for lawsuit towards the clinician. If, for example, a client is expressing

recurring dreams of suicidal ideation and the clinician does not report and address such matters this is harmful malpractice. It is an ethical and legal duty for a clinician to report suicidal ideation, and without further understanding of the content of dreams and dream recall frequency, this hinders the field of psychotherapy.

Remaining within the realm of a clinical perspective, it is also essential for a clinician to understand comorbid factors that may be affecting the way a person dreams. Anxiety has become all too much a social norm within Western society. While it is important to understand the symptomology of anxiety, it is essential to understand how these symptoms can become exacerbated and impact normal functioning – such as dream recollection or sleep itself, which can affect one's ability to dream or recall their dreams. With demanding jobs and busy technological lives, the necessity to look more seriously into understanding mental health is imperative. In order to improve the daily functioning of individuals who may experience fear in a maladaptive manner, which is a symptom of anxiety, there must be an understanding of anxiety and its impact on human behavior, emotional health, and functioning (Reich, Noyes, Coryell & O'Gorman 1986). There are several ways in which humans can respond in a maladaptive fashion toward fear. From a physical perspective, symptoms of anxiety are heart palpitations, excessive sweat, feeling like chest may explode, or even hyperventilating (Reich, Noyes, Coryell & O'Gorman 1986). In turn, this anxiety is typically in response to cognitive functioning such as fear of losing control, feelings of helplessness in that situation which can lead to ultimate feelings like that individual is dying (Reich, Noyes, Coryell & O'Gorman 1986).

According to the Anxiety and Depression Association of America, anxiety disorders are the most common mental illness within the United States (ADAA, 2010-2014). This is keeping in mind eighteen percent of the population ages 18 and older, though. Still, about a quarter

percent of the adult population within the United States of America suffers from an anxiety disorder. While these disorders are extremely treatable, there is still a hefty fraction of this particular population that is not receiving treatment, one third to be exact (ADAA, 2010-2014). Relative to this issue, it is costing the United States over $42 billion a year, which is a third of the cost the United States pays for treating mental illnesses (ADAA, 2010-2014). Moreover, to exacerbate this issue, it is not unusual for those suffering from anxiety disorders to also have a co-morbid mental illness. In particular, depression has been a common mental illness linked with anxiety (ADAA, 2010-2014). The Anxiety and Depression Association of America states that almost one-half of those suffering from an anxiety disorder also may be suffering from depression, too (ADAA, 2010-2014). Not only is two thirds of the population suffering from anxiety not receiving treatment from anxiety, but they are also not receiving treatment for depression.

Likewise, according to the National Institute of Mental Health, women are at greater risk to experience an anxiety disorder. Men are 40% as likely to experience an anxiety disorder, whereas women are 60% more prone to anxiety disorders (NIH, para. 9). Non-Hispanic blacks and Hispanic populations are 20% and 30% less likely in their lifetime, respectively, in their prevalence for an anxiety disorder, unlike non-Hispanic whites (NIH, para. 9). According to research study conducted by Kessler, Berglund, Demler, Jin, and Walters (2005), adults ranging from 18-29 are at a 30.2% lifetime prevalence for anxiety disorders, 30-44 year olds are at a 35.1% lifetime prevalence, 45-59 year old adults have a 30.8% lifetime prevalence, and those who are 60 years old and over are only at a 15.3% lifetime prevalence for an anxiety disorder. These researchers concluded that about half of the United States population will be at a risk for a DSM-IV disorder (Kessler et. al, 2005). In regards to anxiety disorders, the researchers

concluded that anxiety disorders have an average age on-set of about 11 years old (Kessler et. al, 2005). Such statistical information provides the urgency of further exploring the topic of anxiety and possible correlating factors with anxiety that could be contributing or helping to further evaluate an anxiety disorder.

In addition, people who suffer from an anxiety disorder are three or five times more likely to go to the doctor for treatment. Ironically, they are six times as likely to be hospitalized under the category of having a psychiatric disorder, unlike those who do not suffer from an anxiety disorder (ADAA, 2010-2014). While anxiety disorders are highly treatable, there are contributing factors that pose a risk towards having an anxiety disorder, such as genetics, brain chemistry, personality, and life events (ADAA, 2010-2014). More importantly, this is not accounting for those who do not receive treatment. Thus, this raises importance to understand further about individuals who may be on the spectrum for an anxiety disorder. Everyday anxiety is normal and even healthy as it can assist human behavior in everyday life situations such as detecting danger. For example, feeling anxious or stressed before taking a test may cause an individual to study harder prior to taking the exam from fear of failing. This is when anxiety can be beneficial to human functioning. In contrast, when anxiety becomes maladaptive this is an issue that needs to be addressed.

Typical everyday anxiety examples are the following: worrying about paying for the bills, embarrassment in an uncomfortable situation, nerves before a big test, realistic fear of a dangerous situation, or even anxiety or sadness after a traumatic event (ADAA, 2010-2014). However, anxiety that supersedes the threshold of everyday anxiety corresponds to the following behavior(s) or response(s) such as constant worry that interferes with everyday life, avoidance of situations in fear of being humiliated, out-of-the-blue panic attacks, uncontrollable repetitive

actions, and also recurring nightmares or flashbacks (ADAA, 2010-2014). Being able to recognize whether an individual's magnitude of anxiety is adaptive and essential for human survival, or maladaptive by creating harm in a person's life, is essential for an accurate diagnosis of a true anxiety disorder.

Not only are there multiple perspectives that can be used in their applications to understanding why humans dream, there are numerous variables that can be examined to understand the nature of dreams, themselves, such as dream recall frequency, number of dreams, types of dreams, nightmares, and even amount of sleep. Examining these factors will help further develop knowledge in the realms of dreams and anxiety to understand its effects on human behavior. The information that is available about the different layers of how a person dreams and what factors contribute to the way a person dreams will also help determine any correlating factors to dreams. In addition, past studies conducted have given insight into this topic and have found correlating factors, such as gender, to be a contributing factor towards the interpretation and frequency of recalling dreams. Moreover, there have been reports including the possibility with lack of further evidence into the chance that anxiety, as indicated by neuroticism, exacerbates an individual's ability to recall dreams (Schredl, Ciric, Götz, & Wittmann, 2003).

Thus, such previous research has left me with a particular question. Does anxiety correlate with the ability for a person to recall their dreams? The purpose of this study will be testing dream recollection on a spectrum (low dream recall to high dream recall) and whether or not the level of anxiety influences an individual's ability to remember their dreams. This allows a more critical approach to understand potential differences; such as with sleep disturbance patterns, anxiety levels, etc. that may be contributing to the ability for a person to remember their

dreams. In addition, this study attempts to control for demographics, in particular with gender, to see whether there are any gender differences like previous research has noted.

The Present Study

The purpose of this study is to apply my findings to the domains of psychology, particularly clinical and personality psychology, as well as possibly neuroscience. Past research has shown that dream recollection can be determined by several factors such as attitudes towards dreams, personality, visual imagination, visual memory, sleep behavior, and stress measures (Schredl, Wittmann, Ciric, & GÖtz, 2003). In such studies, researchers have found a strong correlation with the factors of attitudes towards dreams, sleep behavior, personality, and creativity (Schredl, Wittmann, Ciric, & GÖtz, 2003). Other factors that have been considered when analyzing dreams are the day-residue effect and dream-lag effect (Nielsen, Kuiken, Alain, Stenstrom, & Powell, 2004). Day-residue effect is when scenarios from the day before manifest within a person's dream of the day before. Similarly, the dream-lag effect is when a person remembers aspects of certain life situations from up to about a week before they have a particular dream (Nielsen et. al, 2004).

Moreover, variables such as cognitive functioning as soon as an individual awakes, introspection, and sleep duration have been investigated within the field of oneirology. Through understanding cognitive functioning as soon as a person wakes from their dream, this method assesses whether or not a person's ability to be cognizant to remember their dreams as soon as they wake up affects their ability to recall. Introspection, which is the ability for a person to reflect on their own mental thoughts, is also important to analyze when it comes to understanding what may be influencing dream recall. Sleep duration must also be considered because it is

interrelated to the impact (or lack thereof) on an individual's ability to use their cognition to recall their dreams. Such factors must be considered for future studies that want to analyze factors that influence dream recollection.

For the purposes of this study, dream frequency/recall, anxiety, sleep disturbance, and dream themes will be analyzed. According to research by Cohen (1974) and Web and Kersey (1967), most people tend to only recall their dreams only half of the time when they wake up (Watson, 2003). Correspondingly to this, some individuals can recall their dreams on an everyday basis, whereas others are not able to do such (Cohen, 1974; Fitch & Armitage, 1989, Goodenough 1991). Such differences in individuals have been broadly supported with its relationship with a person's ability or inability to recall their dreams (Watson, 2003). As Watson stated in 2003, characteristics such as absorption, imaginativeness have been related to high dream recollection. Essentially, the more creative a person is the more vivid they are and tend to have higher levels of imagination. Watson is suggesting creative individuals will remember their dreams more because their dreams are a manifestation of their creative drives that they have in waking, conscious life, unlike those who tend to be identified as less creative.

Moreover, high dream recollection has focused on individual differences, such as gender differences (Watson, 2003). For example, it was concluded that personality was a factor of gender differences in regards to dream recollection (Schredl & Reinhard, 2008). Openness to experience, the extent a person is willing to immerse themselves into unfamiliar experiences, and creativity were shown to have a small significant amount of a relationship to the ability for a person to remember their dreams (Schredl, 2003). Schredl and Reinhard's findings also concluded that amongst the gender differences related to sleep, women reported more night time waking than men. They also deduced that women's sleep quality was impacted, and thus this

may influence their ability to remember dreams (Schredl & Reinhard, 2008). These researchers further supported a study conducted by Schredl in 2007 that the more a person is interested in their dreams the more likely they will be able to recall their dreams (Schredl & Reinhard, 2008). They further suggested the possible gender specific difference correlated with dream recollection in which more feminine people may be able to recall their dreams better than masculine people (Schredl & Reinhard, 2008). Unfortunately, though, no such research has been conducted in testing the correlation between sex-role orientation and one's ability to remember their dreams. However, there has been some content application in understanding dreams as Schredl and Piel in 2005 and Van de Castle in 1994 concluded that men's themes of dreams involved, "…aggression, anxiety, achievement, and work-related themes…" in relation to their dream content which may be correlated with their low level of dream recall versus women (Schredl & Piel, 2005; Van de Castle, 1994; Cowen and Levin, 1995).

While it is interesting to discover Cowen and Levin's finding of lower level of dream recall in men, their study was conducted with an adolescent population. Further assessment of the validity of this finding would need to be addressed with an adult population. Moreover, the content of the dreams of men and women respectively have been correlated to their waking state (Schredl, M., Sahin, V., & Schäfer, G., 1998). In regards to dream content, the ability to recall instances of emotional aspects in a person's life nor emotional aspects itself have been tested in their possible correlation to a person's ability to remember dreams. Such examinations of the relationship between an individual's stressors and their recollection of dreams have been conducted in various forms, but little has been done to determine the relationship between an individual's anxiety levels and its possible effects on the ability for an individual to remember their dreams.

Similarly, there has been little investigation into examining its correlation with the quality of sleep in relation to one's anxiety levels, and if the two play a role in the ability for a person to remember their dreams and the type of dreams an individual experiences. The past studies, as previously mentioned, have given insight into this debate that has been researched by scholars of psychology. However, this present study plans to produce further knowledge in reference towards gender differences being correlated with dream recollection and sleep quality, as has been conducted in the previous research mentioned above. Additionally, this study will examine potential differences in the content of an individual's dreams while accounting for anxiety levels. Therefore it was initially hypothesized that women will report a higher dissatisfaction with their quality of sleep, affecting their ability to recall their dreams. The second hypothesis tested that women will report a higher level of anxiety and will report more themes within the "Paranoia" and "Delusion" section of the Dream Motif Scale. The third hypothesis tested that women who report a higher dissatisfaction with their quality of sleep will report to be more anxious, and this affects their ability to recall their dreams. A final hypothesis tested that the more towards the clinical spectrum of experiencing anxiety that a person is, the less likely they will be to recall their dreams.

Method

Participants

A total of 253 participants, male (N=120) and female (N=133) with the mean age of 34.84 years old from the United States were recruited from Amazon's Mechanical Turk (mTurk). Participants filled out completed the Manheim Dream questionnaire, Beck Anxiety Inventory

Scale, the Dream Motif Scale, the National Institute of Health's PROMIS Sleep Disturbance Scale, and demographics**.** Participants were thanked and debriefed for their time.

Materials/Measures

The Mannheim Dream questionnaire (MADRE; Schredl, Berres, Klingauf, Schellhaas & Göritz, 2014). This scale measures the frequency of the recollection of dreams, history of dreams, nightmares, lucid dreams, an individual's attitudes towards their dreams, and the effects their dream have on their waking life (Schredl, Berres, Klingauf, Schellhaas & Göritz, 2014). Questions assessed within this measure are: "How often do you discuss your dreams with family and friends? How much attention to do you usually pay towards your dreams? In general, how many dreams do you remember per week?" Items on the frequency of the recollection of dreams were 0= never to 7 = several times a week. For the purposes of this study, item 9 was deleted, and items related to frequency of the recollection of dreams and nightmares along with emotional intensity and nightmare distress were used in analysis.

Calvin Yu developed the Dream Motif Scale (DMS; Yu, 2012) is a 110-item questionnaire that addresses several aspects of dream content. In analysis, the "Paranoia" subscale (a=.88) and the "Delusion" subscale (a=.95), which further supported its internal reliability. For example, there are dream themes such as "falling" or "being chased or pursued" within the domain of "Paranoia" that helps give a further insight into the content of an individual's dreams (Yu, 2012). Some aspects of the questionnaire deal with more everyday scenarios, such as "schools, teachers, studying" (Yu, 2012). The DMS is based on a 5-point scale with 0 being "never or unsure" and 4 being "once a month or more often". Yu includes 110 dream themes and 10 subtypes of typical dreams within his questionnaire in addition to a touch

of Freudian symbolism such as sexual themes. The scale Furthermore, it is suggested that with his addition of Freudian themes that Yu, like Freud, believes in dreams being a defense mechanism for humans. For the purposes of this study, I will be extracting the "Paranoia" (7-itemed) and "Delusion" (30-itemed) themes to allow me to further determine, with assessment of anxiety levels, the possible correlation to dreams and dream recollection.

Beck's Anxiety Inventory Scale (BAI; Beck, Epstein, Brown, & Steer, 1988) is a 21-item self-report with supported internal reliability (a=.95) (Beck, Epstein, Brown, & Steer, 1988). This scale gives a common list of anxiety symptoms: "Numbness or tingling, Feeling hot, Wobbliness in legs, Unable to relax, Fear of worst happening" and so on. This scale measures the frequency of an individual being bothered by such symptoms within the present moment or even the last month by rating from 0-3 ("0" Not At All to "3" Severely – it bothered me a lot). Thus, this scale is interpreted by adding the sum of an individual's score and placing them into one of three categories: 0-21 grand sum indicating low anxiety, 22-35 grand sums indicating moderate anxiety, and a grand sum exceeding 36 as anxiety that causes a potential for concern with the possibility of receiving professional help. This scale will allow an assessment that will account for those who experience low anxiety to those who may be experiencing clinical anxiety which will allow high internal validity towards supporting my study.

The National Institute of Health's PROMIS Sleep Disturbance (a=.93) is a measurement that has an 8-item scale. This assesses an individual's sleep quality, sleep depth, and sleep restoration (PROMIS Sleep Disturbance; National Institute of Health, 2014). This scale has five responses for each question ranging from "Not at all" to "Very much". Questions that appear in the PROMIS Sleep Disturbance scale are as of the past seven days and also vary from "My sleep was refreshing…" to "I had a problem with my sleep…" Additionally, sleep quality is assessed

by asking participants within the past seven days, “My sleep quality was…” with response ranging from “Poor” to “Very good”. Such range better assesses within a concise format of an individual’s ability to stay asleep or not get sleep alongside their own interpretation of how content they are with the sleep they received in the past seven days. The PROMIS Sleep Disturbance scale has various forms with particular criteria, however for the purposes of this study I will be using form 8a for the adult population with some expected variability as this will distributed to the general adult population. As for results, if individual scores 50 or higher, it is likely their sleep possibly may be of a chronic illness (i.e. insomnia).

Results

It was initially hypothesized that gender differences would exist for several dependent variables, including: dream frequency/recall, nightmare frequency, anxiety levels, sleep dissatisfaction, paranoia themed dreams, and delusional themed dreams. As such, a series of independent samples t-test were conducted (see Table 1.0). Based on those results, there were no significant differences between genders on most of these variables. However, there was a significant difference between men and women on nightmare frequency.

While asking about the frequency of dreams and nightmares, I also wanted to test whether there were gender differences between the emotional intensity and nightmare distress. To test for the emotional intensity and nightmare distress differences amongst men and women, another set of independent samples t-test was conducted. Results showed that there were significant gender differences between men and women with both emotional intensity of dreams (M_{men}= 5.13, SD_{men} = .95 vs. M_{women}= 4.80, SD_{women} = 1.61) and nightmare distress (M_{men}= 5.67, SD_{men} = 1.07 vs. M_{women}= 5.10, SD_{women} = 1.23). Results are displayed in Table 1 below:

Table 1.0 *Detecting gender differences in dream frequency/recall, nightmare frequency, emotional intensity of dreams, nightmare distress, anxiety levels, sleep dissatisfaction, paranoid themed dreams, and delusion themed dreams (N=253).*

	Gender				
	Men	Women	*t*	*df*	*p*
Dream Frequency/Recall	2.99 (1.41)	2.99 (1.61)	.04	251	1
Nightmare Frequency	3.86 (1.66)	4.26 (1.87)	1.81	251	.07
Anxiety Levels	12.69 (13.37)	13.36 (12.24)	1.04	251	.30
Sleep Dissatisfaction	20.63 (8.12)	22.56 (8.84)	1.80	251	.07
Paranoia Themed Dreams	8.38 (6.77)	7.99 (6.59)	-.47	251	.64
Delusion Themed Dreams	34.44 (23.56)	29.88 (21.15)	-1.62	251	.11
Emotional intensity of dreams	5.13 (.95)	4.80 (1.08)	-2.56	251	.01
Nightmare distress	5.67 (1.07)	5.10 (1.23)	-3.16	251	.00

**Note.* Standard deviations appear in parentheses below the means.

After finding no gender differences between men and women on dream frequency/recall, I wanted to test whether dream frequency/recall, nightmare frequency, emotional intensity of dreams, nightmare distress correlated with sleep disturbance, anxiety levels, paranoia, and delusion themed dreams. A Pearson correlation test was performed and results showed that dream frequency/recall and sleep dissatisfaction (r= -.16, *p*=.01), anxiety levels (r = -.20, *p*=.00), paranoia themed dreams (r= -.30, *p*=.00), and delusion themed dreams (r=-.36, *p*=.00) showed significant negative correlations. A similar test also showed that nightmare frequency had a positive correlation with sleep dissatisfaction (r= .35, *p*=.00), anxiety levels (r= .35, *p*=.00), paranoia themed dreams (r= .37, *p*=.00), and delusion themed dreams (r= .39, *p*=.00). Thus, most variables negatively correlated with dream frequency and recall but positive correlated with nightmare frequency and recall.

A Pearson correlation test for emotional intensity of dreams and sleep dissatisfaction (r= -.23, *p*=.00), anxiety levels (r= -.20, *p*=.00), paranoia themed dreams (r= -.26, *p*=.00), and delusion themed dreams (r= -.32, *p*=.00) all showed significant negative correlations. Another similar test showed that nightmare distress and sleep dissatisfaction (r= -.30, *p*=.00), anxiety levels (r= -.21, *p*=.00), paranoia themed dreams (r= -.24, *p*=.00), and delusion themed dreams (r= -.20, *p*=.00) all showed significant negative correlations. As a result, dream frequency/recall, emotional intensity of dreams, and nightmare distress had a significant negative correlation with sleep disturbance, anxiety levels, paranoia themed dreams, and delusion themed dreams. However, a significant positive correlation occurred with nightmare frequency and sleep disturbance, anxiety levels, paranoia themed dreams, and delusion themed dreams. Results are displayed in Tables 2 and 3 below:

Table 2.0 *Testing the correlation of dream frequency/recall and nightmare frequency with sleep disturbance, anxiety levels, paranoia themed dreams, and delusion themed dreams without accounting for gender differences (N=253).*

	1 Anxiety	*2 Dream Frequency/Recall*	*3 Nightmare Frequency*	*4 Paranoia Themed Dreams*	*5 Delusion Themed Dreams*
1. Anxiety	*1*	*-.16***	*.35***	*.42***	*.50***
2. Dream Frequency/Recall	*-.16***	*1*	*-.35***	*-.30***	*-.36**
3. Nightmare Frequency	*-.20***	*-.35***	*1*	*.37***	*.39***
4. Paranoia Themed Dreams	*.42***	*.15**	*.37***	*1*	*.77***
5. Delusion Themed Dreams	*.50***	*.12**	*.39***	*.77***	*1*

*Correlation is significant at the .05 level (2-tailed).

**Correlation is significant at the .001 level (2-tailed).

Table 3.0 *Testing the correlation of emotional intensity of dreams and nightmare distress with sleep disturbance, anxiety levels, paranoia themed dreams, and delusion themed dreams without accounting for gender differences (N=253).*

	1 Anxiety	*2 Emotional Intensity of Dreams*	*3 Nightmare Distress*	*4 Paranoia Themed Dreams*	*5 Delusion Themed Dreams*
1. Anxiety	*1*	*-.20***	*-.21***	*.42***	*.50***
2. Emotional Intensity of Dreams	*-.20***	*1*	*.40***	*.15**	*.13**
3. Nightmare Distress	*-.21***	*.40***	*1*	*.24***	*-.20***
4. Paranoia Themed Dreams	*.42***	*.15***	*.40***	*1*	*.77***
5. Delusion Themed Dreams	*.50***	*.12**	*-.20***	*.77***	*1*

*Correlation is significant at the .05 level (2-tailed).

**Correlation is significant at the .001 level (2-tailed).

Given these results, I wanted to see whether dream frequency/recall was predicted by sleep disturbance, anxiety levels, paranoia themed dreams, delusion themed dreams, and emotional intensity of dreams. To see whether these variables predicted dream frequency/recall, a multiple regression test was conducted. The results of the regression indicated that this model explained 21% of the variance on dream frequency/recall (R^2=.21, F(5, 247)=13.09, p<.01). Within that model, both dream intensity (β=.295, p<.000) and Delusion themes (β=-.23, p=.016) were significant predictor, though in opposing directions.

Likewise, I also wanted to see whether emotional intensity of dreams was a predictor of sleep disturbance, anxiety levels, paranoia themed dreams, delusion themed dreams, and dream frequency/recall. The results of that regression showed that sleep disturbance, anxiety levels, paranoia themed dreams, delusion themed dreams, and dream frequency/recall explained 20% of the variance on emotional intensity of dreams (R^2=.20, F(5,247)=12.31, p<.01). Within this

model, sleep disturbance (β=-.13, p<.05) and dream frequency/recall (β=.30, p=.00) were significant predictors of emotional intensity of dreams (See Table 5.0).

Similarly, I also wanted to see whether nightmare frequency was a predictor of sleep disturbance, anxiety levels, paranoia themed dreams, delusion themed dreams, and nightmare distress. To test this, a multiple regression test was performed. Results of this regression indicated that these variables explained 48% of the variance on nightmare frequency (R^2=.48, F(5, 247)=44.64, p<.01). Since these variables explained 48% of the variance on nightmare frequency, I wanted to see whether they would also explain a significant portion of the variance on nightmare distress since nightmare distress was a significant predictor of nightmare frequency within this model (β=-.61, p=.00) (See Table 6.0). A similar regression that tested whether nightmare distress was a predictor of sleep disturbance, anxiety levels, paranoia themed dreams, delusion themed dreams, and nightmare frequency. Results showed that these variables explained 40% of the variance on nightmare distress (R^2=.40, F(5, 247)=32.70, p<.01). As for this model, sleep disturbance (β=.09, p=.09) delusion themed dreams (β=.19, p=.02), and nightmare frequency (β=-.53, p=.00) were the biggest predictors of nightmare distress (See Table 7.0). The following results are displayed in Tables 4, 5, 6, and 7 below:

Table 4.0 *A multiple regression testing whether sleep disturbance, anxiety levels, paranoia themed dreams, delusion themed dreams, and emotional intensity of dreams predicted dream frequency/recall (N=253).*

Dream Frequency/Recall				
	R^2	F	df	*p*
Model Summary	.46	13.09	5	.000
Variable	B	SEB	β	*p*
Sleep Disturbance	-.00	.01	-.01	.83
Anxiety Levels	.00	.01	-.00	.99
Paranoia themed Dreams	-.01	.02	-.04	.67

Delusion themed Dreams	-.02	.01	-.23	.02
Emotional Intensity of Dreams	.43	.09	.30	.00*

**Note.* R2=.46, F(5,247)=13.09, p<.01

Table 5.0 *Multiple regression testing whether sleep disturbance, anxiety levels, paranoia themed dreams, delusion themed dreams, and dream frequency/recall predicted emotional intensity of dreams (N=253).*

Emotional Intensity of Dreams				
	R^2	F	df	*p*
Model Summary	.45	12.31	5	.000
Variable	B	SEB	β	*p*
Sleep Disturbance	-.02	.01	-.13	.05*
Anxiety Levels	.00	.01	-.01	.93
Paranoia themed Dreams	.00	.01	.02	.87
Delusion themed Dreams	-.01	.00	-.18	.06
Dream Frequency/Recall	.20	.04	.30	.00*

***Note.* R2=.45, F(5,247)=12.31, p<.01

Table 6.0 *Multiple regression testing whether sleep disturbance, anxiety levels, paranoia themed dreams, delusion themed dreams, and nightmare distress predicted nightmare frequency (N=253).*

Nightmare Frequency				
	R^2	F	df	*p*
Model Summary	.63	32.70	5	.000
Variable	B	SEB	β	*p*
Sleep Disturbance	-.02	.02	-.11	.06
Anxiety Levels	.00	.01	.02	.77
Paranoia themed Dreams	-.02	.01	-.09	.28
Delusion themed Dreams	.01	.00	.12	.13
Nightmare Distress	-.40	.04	-.61	.00*

*Note. R2=.63, F(5, 247)=32.70, p<.01

Table 7.0 *Multiple regression testing whether sleep disturbance, anxiety levels, paranoia themed dreams, delusion themed dreams, and nightmare frequency predicted nightmare distress (N=253).*

Nightmare Distress				
	R^2	F	df	*p*
Model Summary	.69	44.64	5	.000
Variable	B	SEB	β	*p*
Sleep Disturbance	.02	.01	.09	.09*
Anxiety Levels	.01	.01	.09	.12
Paranoia themed Dreams	.01	.02	.03	.66
Delusion themed Dreams	.02	.01	.19	.02*
Nightmare Frequency	-.80	.07	-.53	.00*

*Note. R2=.69, F(5, 247)=44.64, p<.01

Discussion

This is the first known research which has also had American participants answering Schredl's MADRE questionnaire, to my knowledge, and thus these findings show numerous implications which will be discussed in the following conclusions and relevant support of previous findings with Schredl's German population (Schredl, 2003; Schredl, Beres, Klingauf, Schellhaas, & Göritz, 2014; Schredl & Piel, 2005; Schredl, Sahin, & Schäfer, 1998; Schredl & Reinhard, 2008; Schredl, Wittmann, Ciric, & GÖtz, 2003). It was initially hypothesized that women will report a higher dissatisfaction with their quality of sleep, affecting their ability to recall their dreams. This was hypothesized due to past research which has suggested the potential differences in dream frequency/recall (Schredl & Reinhard, 2008). After conducting such tests, results showed that no gender differences dream frequency/recall amongst genders, but women did report higher dissatisfaction with their sleep, so only the initial portion of my hypothesis was supported. The second hypothesis tested that women will report a higher level of anxiety and will report more themes within the "Paranoia" and "Delusion" section of the Dream Motif Scale. Since there were no gender differences in anxiety, but there were differences in the "Delusion" section of the DMS with men reporting higher delusion themed dreams compared to women.

Given these results, the first portion of the original hypothesis was not supported. A third hypothesis tested that women who report a higher dissatisfaction with their quality of sleep will report to be more anxious, and this affects their ability to recall their dreams. It was concluded that women did indeed report higher sleep dissatisfaction compared to men yet were not different in anxiety levels or dream frequency. In addition, women did report higher levels of nightmare frequency compared to men, which is supported by previous research that has suggested that women's sleep quality was impacted and thus may influence their ability to remember dreams (Schredl & Reinhard, 2008, Schredl & Reinhard, 2011). Thus, only the first portion of the third hypothesis was supported. A final hypothesis tested that the more towards the clinical spectrum of experiencing anxiety that a person is, the less likely they will be to recall their dreams was not supported due to a negative correlation with anxiety levels and dream frequency.

However, what can be concluded is that nightmare frequency positively correlated with sleep disturbance, anxiety levels, paranoia themed dreams, and delusion themed dreams. This is the first known correlation of these variables that has been made. Meaning, individuals who experience frequent nightmares have poorer sleep quality, higher anxiety, and are more likely to have paranoia and delusion themed dreams. Content-wise, the emotional intensity of dreams and nightmare distress reported higher scores for men when compared to women, thus mean reported more emotionally intense dreams and distressing nightmares, which is contrary to the findings of Schredl &Reinhard (2011) who found that "…Nightmare distress was also higher in women compared to men…" (p.120). Previous research has suggested that men's themes of dreams involved, "…aggression, anxiety, achievement, and work-related themes…" which could be potentially link to paranoia and delusion themed dreams for future realms of research (Schredl & Piel, 2005; Van de Castle, 1994).

Additionally, emotional intensity and nightmare distress both negatively correlated with sleep dissatisfaction, anxiety levels, paranoia themed dreams, and delusion themed dreams. The biggest predictor for dream frequency was emotional intensity of dreams. On the other hand, though, sleep disturbance was the biggest predictor for the emotional intensity of dreams. Lastly, nightmare distress explained the largest portion of variance for nightmare frequency. In particular, sleep disturbance, delusion themed dreams, and nightmare frequency were the biggest predictors of nightmare distress. The following conclusions can be made from these findings: first, the more intense an individual's dreams are, the more likely they will remember their dreams since they are more likely to awake to recall their dreams during REM sleep and "…it keeps them in the lighter stages of sleep, from which they can be awakened easily…", which brings it into their conscious awareness and supports my findings of sleep disturbance being the largest predictor of emotional intensity of dreams (NIH, 2014). How distressing someone's nightmare is, which can relate to the intensity a person has in their dreams, could also explain the nightmare frequency. Future studies need to examine the potential relationship between emotional intensity of dreams and nightmare distress.

In regards to dream content, the ability to recall instances of emotional aspects in a person's life nor emotional aspects itself have been tested in their possible correlation to a person's ability to remember dreams (Schredl, M., Sahin, V., & Schäfer, G., 1998). Therefore, this is the first known research which has linked the emotional aspects of dreams and nightmares – emotional intensity of dreams and nightmare distress – with factors such as dream frequency and nightmare frequency. Future studies need to be conducted in order to test for the reliability of such findings. In particular, the investigation of the potential relationship between certain personality factors, anxiety levels, and dream frequency/recall. In previous research, personality

has been concluded as a factor of gender differences in dream recollection (Schredl & Reinhard, 2008).

For example, the personality domain of "Openness to experience", or the extent a person is willing to immerse themselves into unfamiliar experiences, and "creativity" were shown to have a small significant amount of a relationship to the ability for a person to remember their dreams (Schredl, 2003). Likewise, it would be significant for future studies to test whether anxiety predicts certain personalities that will either be more or less likely to recall their dreams. While gender differences were not at significant levels since personality wasn't accounted for within the present study it is still valuable to test the relationship between personality, anxiety, and dream frequency/recall. Additionally, research has shown that the contributing factors for a potential anxiety disorder such as genetics, brain chemistry, personality, and life events further support that future research should be directed towards understanding this relationship (ADAA, 2010-2014). Potential research questions such as, "Are individuals who are anxious less likely to immerse themselves into unfamiliar experiences also more likely to recall their dreams?" could be useful in operationalizing this concept.

Despite lack of gender differences in my initial hypotheses, there are questions left unanswered as to why men scored lower dream and nightmare frequency/recall compared to women, but scored higher on emotional intensity of dreams and nightmare stress. Also, women did report higher anxiety scores, though not significant enough. Therefore, it is conceivable that gender socialization, particularly in the United States, could be contributing to the potential correlation with nightmare distress and emotional intensity of dreams. This is characterized as males seen as "tough" and not having to exhibit emotions whereas women are more accepted if

they express emotions. Furthermore, it is also uncertain to discern whether those who reported higher dream frequency/recall also reported higher levels of nightmare frequency.

According to the psychoanalytic perspective, dreams are a part of the unexpressed unconscious thoughts in waking life (Ket de Vries, 2014), thus it is hard to differentiate whether individuals are simply repressing either their dreams or nightmares. Lastly, it is important to know whether "Paranoia" and "Delusion" themed dreams could be a potential symptom of anxiety that has not been examined. Since nightmare frequency was positively affected by these variables and positively correlated with anxiety, future studies need to examine this potential relationship. Since the demographics within the this sample were not analyzed in terms of race and ethnicity, it is also a possibility that the interpretation of the "Paranoia" and "Delusion" themed dreams varied based on the numerous cultures within the United States. For example, "…Native Americans, Australian Aborigines, and many African tribes view human flight as accepted phenomena…" (Chandler, 1987, p. 410). Thus, the cultural perspective on dreams would be supported if this conclusion could be made in future studies. Conclusively, the implications of the present study allow flexibility in future replications and directions in hopes of fulfilling the inquiries within the field of oneirology as it continues to expand in its directions.

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ACADEMIC VITA

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EDUCATION

Penn State Abington, Abington, PA

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Honors Thesis: "The Frequencies of Dreams and Nightmares: Examining Dream Content and Environmental Factors"

Schreyer Honors College, *member since 2013*

Psi Chi: The International Honors Society in Psychology, *member since 2014*

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West Philadelphia Catholic High School, Philadelphia, PA

High School Diploma 2011

AWARDS

Dean's List, *Penn State Abington* FA12, SP13, SP14, FA14, SP15

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RESEARCH EXPERIENCE

Public Health Management Corporation, Research and Evaluation Group, Philadelphia, PA

Mealtime Observer *to Janene Brown, Alexandra Ernst, and Gabreille Grode*, Eatiquette Program

Dates: August 2015-present

- Utilizing visual estimation methods of behavioral observation and nutritional intake
- Documentation of quantitative and qualitative data within observation forms

- Approached barriers to data collection and observation within a scientific method framework

Penn State Abington, Psychology Department, Abington, PA

Data Collection Specialist *to Dr. Jacob Benfield*, Centennial Commons Renovation Project with the Fairmount Park Conservancy

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- Conducting in-person interviews about behaviors through a systematic sampling procedure
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- Communicated barriers with data collection methods to improve the quota for targeted sample population

Penn State Abington, Psychology Department, Abington, PA

Honors Thesis, *Researcher, "*Dream Recollection Based on Individual Anxiety in Correlation to Sleep Disturbance While Accounting for Differences amongst Gender"

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- Researching anxiety's relationship to dream recall across gender and accounting for environmental factors, sleep quality, and dream content
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- Certified to work with human subjects through the Collaborative Institutional Training Initiative (CITI)
- Strengthening research and analytical skills in order to develop original research
- Instructed and debriefed study participants, and provided support to participants throughout the study
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Rose's Journey, Philadelphia, PA

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