An examination of waking day stress, personality and emotions in relation to the prediction of nightmare frequency and distress: A pilot study

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Summary. The purpose of the study was to identify how influential waking day stress, personality, and emotions can be on the frequency and distress of nightmares. It was hypothesized that higher ratings of waking day stress, neuroticism, and negative emotions would be associated with increased frequency and distress of nightmares. Participants included 52 individuals who filled out questionnaires such as the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983) and the Big Five Inventory (John & Srivastava, 1999). The study found that waking day stress, neuroticism, and negative emotions were significantly positively correlated with nightmare distress. In contrast, extraversion was significantly negatively associated with nightmare frequency, whereas openness to experience had a significant positive correlation with nightmare frequency. This study used self-report data in order to understand which aspects of waking day life can have an impact on nightmare frequency and distress. Limitations and future directions are also addressed.

Keywords: stress, distress, nightmares, emotions, personality

1. Introduction

Nightmares can be a very unpleasant and impactful experience. Over the years, increasing knowledge has been gathered about the relationship between waking day life, dreams, and how there may be a continuation between the two (Malinowski, Fylan, & Horton, 2014). With that being said, this raises the question of what precisely in our daily lives seems to have an influence on how frequently nightmares are experienced, and how distressing they may be on the individual.

Chrousos and Gold (1992) mention that stress is a period that threatens the homeostasis of an individual. For instance, Maritta, Ruthaychonnee, and Minna (2017) found that those who experienced higher levels of stress also had more symptoms associated with depression. One of the most common factors contributing to nightmares appears to be waking day stress. Stress levels, combined with quality of sleep, health, arguments, and grief can influence the frequency of one's nightmares (Schredl, Biemelt, Roos, Dünkel, & Harris, 2008; Schredl, Erlacher, Reiner, & Woll, 2014). In addition, lower self-reported well-being, as well as nightmare distress, influences the frequency with which one experiences nightmares, not only for adults, but for children as well (Duval, McDuff, & Zadra, 2013; Schredl, Fricke-Oerkermann, Mitschke, Wiater, & Lehmkuhl, 2009; Zadra & Donderi, 2000).

Personality is made up of characteristics that make an individual who they are and result in a unique distinction from every other person (Moghavvemi, Woosnam, Paramanathan, Musa, & Hamzah, 2017). The Big Five factors of personality have been studied in terms of dreams in order to determine whether certain combinations of these factors could lead to specific types of dreams, such as nightmares. For example, Schredl, Bocklage, Engelhardt, and Mingebach (2009) found that higher rates of neuroticism in individuals appears to indicate that they will have nightmares more frequently than those with low neuroticism. In addition, Schredl and Göritz (2017) found that neuroticism was related to how frequently individuals experience nightmares; however, interestingly enough, so was openness to experience and conscientiousness. While surprising, this makes one think about how all five personality traits, to differing degrees, could potentially influence nightmares.

Emotions are said to involve neural circuits that allow humans to read and recognize the emotional atmosphere, feelings, and cognitive processes that allow individuals to interpret what we are feeling (Izard, 2010). In regard to dreams, the continuity hypothesis is primarily what sets the groundwork for how we understand this phenomenon. The hypothesis states that what individuals experience in their waking life significantly influences and takes place in their dreaming life (Malinowski et al., 2014). DeCicco, Lyons, Pannier, Wright, and Clarke (2010) found support for the continuity hypothesis through their work with breast cancer patients, with further support from Robert and Zadra (2014), Zadra, Pilon, and Donderi (2006), and Schredl and Mathes (2014), who found that negative emotions such as anger, sadness, fear, and frustration were frequently present in nightmares as well as in waking day life. In difference, Schredl (2003) found that, while negative emotions were associated with frequent nightmares, positive emotions led to nightmares being experienced on a less frequent basis.

In their research, DeCicco, Zanasi, Dale, Murkar, Longo, and Testoni (2012) found cross-cultural support for the continuity hypothesis, with the dream content of Italians and Canadians showing a relation between waking day anxiety and dream anxiety. However, this research mainly targeted Western cultures. In comparison, Yu (2007) explored the continuity hypothesis in terms of Eastern cultures, also finding that emotionality and mood prior to sleep was continued throughout dreaming and even evident afterwards, providing additional support for the continuity hypothesis.

Nightmares are defined as intense, unpleasant, and arousing dreams that occur during REM sleep and result in the individual suddenly awakening (Fireman, Levin, & Pope, 2014). Oftentimes, nightmares can be confused with bad dreams. The clear distinction between the two is that nightmares cause the dreamer to awaken, whereas bad dreams do not (Fireman et al., 2014). Fireman et al. (2014) compared the dream content of nightmares and bad dreams, finding that bad dreams occurred much more frequently than nightmares did; however, nightmares appeared to contain more aggression and have more references to death than bad dreams.

Although many studies have examined how waking day occurrences such as stress, personality, and emotions have influenced the frequency and intensity of nightmares, no study has yet reviewed all three aspects altogether. As a result, it would seem that further research is needed to identify how these three waking day occurrences influence the frequency of nightmares entirely, and, if nightmare frequency can be predicted by these three variables.

Based on previous research, it is hypothesized that:

- Hypothesis 1 stated that those with higher waking day stress levels would experience nightmares frequently and experience more nightmare distress (Schredl et al., 2014).
- Hypothesis 2 stated that those with lower stress levels during the day would experience nightmares and subsequent distress less frequently (Schredl et al., 2014).
- Hypothesis 3 stated that individuals high in neuroticism would experience higher frequency of nightmares and increased nightmare distress (Schredl & Göritz, 2017; Schredl et al., 2009).
- Hypothesis 4 stated that individuals scoring high in conscientiousness, agreeableness, extraversion, or openness to experience would rarely report nightmares or nightmare distress (Schredl, 2003; Schredl, 2009; Schredl et al., 2009).
- Hypothesis 5 stated that those experiencing more negative emotions in daily life would report higher nightmare frequency and nightmare distress (Robert & Zadra, 2014; Zadra et al., 2006).
- Hypothesis 6 stated that those who report positive emotions would report nightmares and nightmare distress much less frequently (Robert & Zadra, 2014; Zadra et al., 2006).

2. Method

2.1. Participants

In this study, there were 52 participants involved, comprised of 8 males and 44 females. The individuals were enrolled in the online first year Psychology course at Trent University in Peterborough, Ontario. Participants were recruited through the SONA system, which allowed individuals to participate in research and, in return, receive bonus marks that were added to their overall grade in the designated course. When completing the study, an external source was used through SONA, called Qualtrics.

2.2. Materials

For the given study, five questionnaires were used to assess participants' levels of waking day stress, personality traits, emotions, and their corresponding frequency and distress of nightmares. In addition, a description of one of their most prominent nightmares was requested. Before the study, consent was collected from each participant, as well as general demographics. After the study, participants received a debriefing.

2.2.1 The Perceived Stress Scale

The Perceived Stress Scale (Cohen et al., 1983) assesses how stressed individuals have been feeling in the past month by asking questions regarding a number of different circumstances. It includes 14 questions, asking the participant to indicate how often they have experienced those type of stressed feelings in the past month. The scale is to be answered using a 5-point scale, ranging from *(0) Never – (4) Very Often*, to questions such as *'In the last month, how often have you felt nervous and "stressed"?'* and *'In the last month, how often have you been able to control irritations in your life?'*. In order to get a measurement, some of the questions require a reversal of the score, and then an accurate determination of how stressed an individual has been feeling in the past month can be seen. Coefficient alpha for the Perceived Stress Scale ranged from .84 to .86 in their three samples (Cohen et al., 1983).

2.2.2 The Big Five Inventory

The Big Five Inventory (John & Srivastava, 1999) measures the five personality traits of neuroticism, extraversion, contentiousness, agreeableness, and openness to experience. The participants respond to 44 statements on a 5-point scale, ranging from *(1) Disagree Strongly – (5) Agree Strongly*, determining how relatable each statement is to themselves. The statements refer to things such as *'I see myself as someone who starts quarrels with others'* or *'I see myself as someone who prefers work that is routine'*. Some statements require reversing the scores, but afterwards, each of the five personality traits will elicit an overall score. Coefficient alpha for the Big Five Inventory is .83, with specific instruments scoring as follows: .88 for extraversion, .79 for agreeableness, .82 for conscientiousness, .84 for neuroticism, and .81 for openness (John & Srivastava, 1999).

2.2.3 The Positive and Negative Affect Schedule

To measure emotions, the Positive and Negative Affect Schedule (PANAS) (Watson, Clark, & Tellegen, 1988) was used. The PANAS includes positive and negative feelings and emotions that individuals are to indicate how frequently they have felt each over the past few weeks. The scale consists of 20 emotions that participants respond to, using a 5-point scale, ranging from *(1) Very Slightly or Not At All – (5) Extremely*, to feelings such as *'Interested'* and *'Ashamed'*.

To get an indication of how frequently an individual experiences negative or positive emotions, each of the negative and positive affect scores are added up separately. Coefficient alpha for positive affect is .88, similar to the coefficient alpha of .87 for negative affect (Watson et al., 1988).

2.2.4   The Nightmare Frequency Questionnaire and the Nightmare Distress Questionnaire

Finally, to measure nightmares, two questionnaires were used, the Nightmare Frequency Questionnaire (Krakow et al., 2000) assesses how frequently in the past three months participants have experienced nightmares, and the Nightmare Distress Questionnaire (Belicki, 1992) measures how influential nightmares can be on individuals waking day life. The Nightmare Frequency Questionnaire has two parts, one to determine how many nights in a year an individual experiences a nightmare, and the other to determine how many nightmares are experienced in a year, because it is possible to have more than one nightmare a night. In difference, the Nightmare Distress Questionnaire consists of 13 questions that assess information about participants nightmares, feelings about their nightmares, and how influential they may be on their emotional well-being. Each of the questions are answered on one of three 5-point scales, ranging from *(4) Always – (0) Never, (0) Not At All – (4) A Great Deal,* or *(0) Not At All Interested – (4) Extremely Interested*. The questions are asked in ways such as *'Are you ever afraid to fall asleep for fear of having a nightmare?'* and *'Do nightmares affect your well-being?'*. To determine how influential nightmares are, the score for all 13 questions are added up. Coefficient alpha for the Nightmare Distress Questionnaire ranged from .83 to .88 between the four studies (Belicki, 1992).

2.3. Procedure

Participants signed up to take part in this study through the Trent University SONA system. Individuals were recruited depending on whether or not they have experienced some type of disturbing dreams or nightmare. When participating in the study, participants were directed to an external source, Qualtrics. Upon agreeing to participate in the study, participants were first required to read through, electronically sign and date the consent form, which took each individual through the purpose of the study and ensured that confidentiality would not be breeched. It also informed the participant about how many bonus credits they would be receiving by taking part in the study, and that they could leave the study at any point in time.

After completion of the consent form, participants completed a demographics form. Following the consent form, participants created a code that was unique to them by filling in a few blanks relevant to their lives, assuring their anonymity. Following anonymity, the five questionnaires were completed. The first was the Perceived Stress Scale (Cohen et al., 1983), followed by the Big Five Inventory (John & Srivastava, 1999), the Positive and Negative Affect Schedule (Watson et al., 1988), the Nightmare Frequency Questionnaire (Krakow et al., 2000), and the Nightmare Distress Questionnaire (Belicki, 1992). To determine what each individual considered a nightmare, an example of one of their most memorable nightmares was requested, and they were reminded of the difference between dreams and nightmares. The nightmares were coded by the researcher to determine which aspects of the included scales (e.g.,

neuroticism, positive affect) were included in the nightmare itself. In completing the study, participants were provided with an online debriefing form, again detailing the purpose of the study, and how beneficial the results can be to our well-being.

2.4. Statistical Analysis

Prior to conducting results, information from the participant nightmares had to be coded in order to be used in the analyses. When completing the study, each participant was asked to write a detailed description of one of their most prominent nightmares. To code the nightmares, the researcher used words and phrases that were present in the questionnaires used in the study. For example, if the word "stressed" or "failing" was found, it was coded in terms of stress. When all coding was completed for all nightmares and questionnaires, coding phrases were divided up to reflect the questionnaires. For example, the coding scores for stress created the variable NM_STRESS, indicating that the stress scores were coded from the participant nightmares. A correlation table including all variables was conducted first, to identify which factors were significantly related to one another. For statistical results, stepwise multiple regression analyses were conducted.

3.   Results

3.1. Analysis

In order to assess hypotheses 1 through 6, a correlation table was generated to look at the relationships between waking day stress, personality, emotions, and their individual influences on nightmare frequency. Table 1 displays the correlations between all variables involved.

3.2. Additional Analysis

For those correlations that were statistically significant, a stepwise multiple regression was performed to determine which factors best predict nightmare frequency and subsequent distress.

3.2.1   Nightmares by Number of Nights

To determine which variables are associated with who has the most nightmares based on the number of nights, a correlation table was conducted (see Table 1) to identify which variables were significantly related to the dependent variable. At the bivariate level, conscientiousness (CONS), nightmare frequency by number of nightmares (NFQ_NM), nightmare distress (NDQ), conscientiousness coded in nightmares (NM_CONS), and nightmare frequency coded in nightmares (NM_FREQ) were significant, indicating that nightmare frequency by nights is related to increases in conscientiousness, amount of nightmares, nightmare distress, as well as conscientiousness and nightmare frequency in nightmares. With that, a stepwise multiple regression was conducted to determine how CONS, NFQ_NM, NDQ, NM_CONS, and NM_FREQ each predict nightmare frequency by number of nights (NFQ_N). The findings are summarized in Table 2 (see Appendix).

NM_FREQ was entered into the regression analysis first, as it had the highest bivariate correlation with NFQ_N, accounting for 24% of the variance ($p < .001$). After controlling

Table 1. Correlation Table of Waking Day Stress, Personality, Emotions, Nightmare Frequency and Nightmare Distress.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. PSS	-																			
2. EXT	.08	-																		
3. AGREE	.02	.06	-																	
4. CONS	-.21	-.19	.33*	-																
5. NEUR	.62***	-.20	-.19	-.16	-															
6. OPEN	-.10	-.34*	.05	.31*	.11	-														
7. POS_EMOT	-.36**	.28*	.33*	.09	-.53***	.15	-													
8. NEG_EMOT	.66***	-.13	-.17	-.10	.72***	.18	-.24	-												
9. NFQ_N	-.09	-.30*	.07	.34*	-.12	.31*	.05	.15	-											
10. NFQ_NM	.11	-.36*	-.07	.02	.01	.30*	.07	.08	.39**	-										
11. NDQ	.48***	-.15	.21	.16	.36*	.20	-.11	.57***	.45**	-.06	-									
12. NM_STRESS	.17	.05	.002	-.06	.21	.16	.19	.25	.15	.19	.28	-								
13. NM_EXT	-.08	-.08	-.10	-.03	-.02	-.004	.14	-.06	-.04	-.05	-.10	.38**	-							
14. NM_AGREE	-.08	-.04	.23	.08	.002	.11	.21	.06	-.04	-.06	.10	.30*	.21	-						
15. NM_CONS	.30*	-.38**	-.05	-.13	.39**	.23	-.22	.36*	.38*	.26	.50***	.41**	-.01	.20	-					
16. NM_NEUR	-.04	.16	.17	-.06	.08	-.05	.09	.22	-.19	-.11	-.08	.14	.01	.15	.00	-				
17. NM_OPEN	-.22	-.07	-.15	.07	-.03	-.03	.06	-.11	-.18	.02	-.13	-.03	.08	.28	.07	.28	-			
18. NM_POS	.004	.15	-.07	.19	-.04	.07	.13	.17	-.05	-.06	.02	-.07	-.07	-.09	-.15	.38**	.08	-		
19. NM_NEG	.14	.18	-.05	-.11	.16	.13	.01	.09	-.01	-.10	.19	.30*	.07	.18	.31*	.40**	.01	-.06	-	
20. NM_FREQ	-.09	-.002	-.20	.13	-.08	.03	-.01	.06	.47**	-.02	.25	-.10	-.05	-.04	.09	.04	-.15	.04	.03	-
21. NM_DIST	.10	-.06	-.03	.09	.19	.29*	.09	.33*	.20	.30*	.15	.40**	.19	.55***	.29	.36*	.31*	.19	.10	.17

Note. PSS = Perceived Stress Scale; EXT = Extraversion; AGREE = Agreeableness; CONS = Conscientiousness; NEUR = Neuroticism; OPEN = Openness; POS_EMOT = Positive Emotions; NEG_EMOT = Negative Emotions; NFQ_N = Nightmare Frequency Questionnaire – Number of Nights; NFQ_NM = Nightmare Frequency Questionnaire – Number of Nightmares; NDQ = Nightmare Distress Questionnaire; NM_STRESS = Stress in Nightmares; NM_EXT = Extraversion in Nightmares; NM_AGREE = Agreeableness in Nightmares; NM_CONS =Conscientiousness in Nightmares; NM_NEUR = Neuroticism in Nightmares; NM_OPEN = Openness in Nightmares; NM_POS = Positive Emotions in Nightmares; NM_NEG = Negative Emotions in Nightmares; NM_FREQ = Frequency of Nightmares in Nightmares; NM_DIST = Distress of Nightmares in Nightmares.

* p < .05. ** p < .01. *** p < .001.

for NM_FREQ, NFQ_NM was entered into the equation at step two as it had the second highest partial correlation, accounting for 17% of the variance ($p < .01$). When controlling for both NM_FREQ and NFQ_NM, NDQ was entered into the regression analysis at step three, as it had the next highest partial correlation. When taking this variable into question, it accounted for an additional 17% of the variance ($p < .001$). The analysis stopped there as no other variables found significance. As a result, it is predicted that individuals who have more nights where they experience nightmares also have recurrent nightmares, multiple nightmares in a single night, and more distress experienced as a result of their nightmares. In total, 58% of the variance is accounted for when looking at these three predictors of the number of nightmares by the number of nights.

3.2.2 Nightmares by Number of Nightmares

Participants were measured on the number of nightmares they experience, in order to gather an understanding of what alternative variables may be related to the frequency of nightmares. A correlation table was conducted (see Table 1), finding that extraversion (EXT), openness (OPEN), and nightmare frequency by number of nights (NFQ_N) were each significantly correlated with individuals' number of nightmares. A stepwise multiple regression was conducted to determine how EXT, OPEN, and NFQ_N may predict the number of nightmares individuals have each night (NFQ_NM). The findings are summarized in Table 3 (see Appendix).

NFQ_N was entered into the regression analysis first, as it had the highest correlation with NFQ_NM at the bivariate level, accounting for 16% of the variance ($p < .01$). After controlling for NFQ_N, EXT was the second highest partial correlation and was entered at step two, accounting for 8% of the variance ($p < .05$). The regression analysis stopped after step two. The analysis identified that NFQ_N was the most significant predictor of how many nightmares individuals experience, followed by EXT; however, this correlation was negative, indicating that those who experience increased nightmares score lower on extraversion. In total, NFQ_N and EXT accounted for 24% of the variance in predicting NFQ_NM.

3.2.3 Nightmare Distress

A correlation table was conducted (see Table 1) to determine which variables are significantly correlated with nightmare distress (NDQ). With that, it was found that waking day stress (PSS), neuroticism (NEUR), negative emotions (NEG_EMOT), nightmare frequency by number of nights (NFQ_N), and conscientiousness coded in nightmares (NM_CONS) were each significant at the bivariate level with nightmare distress. A stepwise multiple regression was conducted to determine which of the five variables best predict nightmare distress. The findings are summarized in Table 4 (see Appendix).

NEG_EMOT was entered into the regression analysis first as it had the highest correlation with the NDQ at the bivariate level, accounting for 28% of the variance ($p < .001$). After controlling for NEG_EMOT, NFQ_N and NM_CONS were still significant. NFQ_N had the highest partial correlation, so it was entered into the regression analysis at step two, accounting for 16% of the variance ($p < .01$). Due to insignificance, the regression analysis ended at step two. Individuals who experience more nightmare distress also have a

significant amount of negative emotions and frequent nights with nightmares. In total, NDQ is predicted by 44% of variance, involving both NEG_EMOT and NFQ_N.

3.2.4 Frequency of Nightmares Coded in Nightmares

A correlation table was conducted (see Table 1) to determine which variables are associated with how frequently individuals experience the same dream, as mentioned in their dream. Following the analysis, it was determined that only one variable was significant with NM_FREQ at the bivariate level, which was nightmare frequency by number of nights (NFQ_N). This indicates that, of all the variables involved, NFQ_N is the best predictor of NM_FREQ.

3.2.5 Distress of Nightmares Coded in Nightmares

Finally, a correlation table was conducted (see Table 1) for distress noted in nightmares (NM_DIST) in order to determine which variables are most correlated with varying levels of distress. In the matrix, the variables that were significant with NM_DIST at the bivariate level were openness (OPEN), stress coded in nightmares (NM_STRESS), agreeableness coded in nightmares (NM_AGREE), and neuroticism coded in nightmares (NM_NEUR). A stepwise multiple regression was conducted to determine which of the four variables would best predict distress in nightmares. The findings are summarized in Table 5 (see Appendix).

NM_AGREE was entered into the regression analysis first as it had the highest bivariate correlation with NM_DIST, accounting for 30% of the variance ($p < .001$). After controlling for NM_AGREE, NM_NEUR was entered into the regression analysis at step two, considering it had the second highest partial correlation, accounting for 7% of the variance ($p < .05$). Once NM_AGREE and NM_NEUR were controlled for, OPEN became significantly correlated with NM_DIST again, and was entered into the regression analysis at step three, accounting for an additional 7% of the variance ($p < .05$). With that being said, the regression analysis stopped at step three. Considering that OPEN went from being insignificant at step one, to significant once again at step two, indicates that it acts as a suppressor effect, artificially enhancing the prediction of NM_DIST. In terms of NM_DIST, agreeableness in nightmares and neuroticism in nightmares appear to be the best predictors. In total, 37% of the variance predicts NM_DIST.

4. Discussion

The purpose of the present study was to investigate how influential waking day stress, personality, and emotions may be on the frequency of individuals' nightmares, and the distress associated with them, as alternative studies have simply looked at these aspects independently.

Hypothesis 1 stated that participants with higher waking day stress would experience nightmares frequently and with greater distress. The hypothesis was found to be partially supported, as there was a significant positive correlation between waking day stress and nightmare distress, with insignificant results in terms of nightmare frequency. These results indicate that those who experience significant amounts of waking day stress are also likely to experience significant distress as a result of their nightmares. These results are partially inconsistent with previous research, as Schredl et al. (2014) found that increased waking day stress

led to a higher frequency of nightmares.

Hypothesis 2 stated that those with lower waking day stress would experience nightmares and distress to a lesser extent. The study found no significant results to support or dispute this hypothesis. This result is surprising, primarily because Schredl et al. (2014) found support for stress influencing the frequency of participant nightmares, suggesting that lower stress levels could potentially protect from experiencing nightmares. However, the current study did target individuals who experience greater stress and nightmares on a frequent basis, so that could be a reason as to why support was not found for this hypothesis.

Hypothesis 3 stated that those high in neuroticism would experience nightmares frequently and with distress. This was only partially supported. While Schredl and Göritz (2017) found that higher neuroticism led to increased frequency of nightmares, the present study found negative correlations between neuroticism and nightmare frequency, indicating that those who scored higher on neuroticism actually had lower scores on their nightmare frequency by number of nights and their nightmare frequency as stated in their dream. However, in support of hypothesis 3, neuroticism was found to be significantly positively correlated with nightmare distress. With that being said, while neuroticism was not found to influence nightmare frequency, it did appear to impact the distress experienced by nightmares. Levin and Nielsen (2007) did find support for these findings, where neuroticism was related to nightmare distress, which further supports the findings of the current study.

Hypothesis 4 stated that participants high in conscientiousness, agreeableness, extraversion, or openness to experience would report nightmares infrequently and not experience distress. It was mainly unsupported. In terms of extraversion, those with higher scores experience less frequency of nightmares both by number of nights and by number of nightmares, in support of hypothesis 4. However, for agreeableness, no significant results were found. Scores for conscientiousness found that those with high scores experienced greater nightmare frequency, in disagreement with hypothesis 4. Finally, the results of openness to experience indicated that those with higher scores also have higher nightmare frequency by number of nights, number of nightmares, and distress in nightmares, in disagreement with hypothesis 4. The present study found that, while higher scores on extraversion led to decreased nightmare frequency, but not distress, the other three factors of agreeableness, conscientiousness, and openness to experience did not protect against nightmare frequency and distress, as expected. These results, although unexpected for the most part, are in partial agreement with results from Schredl & Göritz (2017), who found that openness to experience and conscientiousness were significantly related to dream recall frequency. Although unsure about their own finding with conscientiousness, the researchers note that those with higher scores on openness to experience could be more creative and prone to take part in fantasies, which may influence their sleep state as well (Schredl & Göritz, 2017).

Hypothesis 5 stated that those who experience negative emotions would be more likely to report greater nightmare frequency and distress. This hypothesis found partial support. In terms of nightmare frequency, no significant results were found with negative emotions. However, for nightmare distress, both the self-report measure and the distress noted in nightmares found positive significance, indicating that negative emotions are associated with how distressing individuals claim that their nightmares are on their daily lives. Levin and Nielsen (2007) also found support for this claim, where higher negative affect/emotionality was greatly associated with nightmare distress. This further supports the current study finding where more negative emotions experienced throughout ones waking day can lead to greater nightmare distress at night.

Hypothesis 6 stated that those with positive emotions would experience nightmares and nightmare distress on a less frequent basis. No significant results were discovered for this hypothesis. These results, while surprising, make sense given the conditions of the current study. When recruiting participants, the researchers only asked for individuals who experience nightmares on a frequent basis and who experience distress as a result. With that being said, it did not provide room for those who experience more positive emotions and infrequent nightmares to take part, which may explain why these results were not found.

When looking at nightmare frequency in the stepwise multiple regression, both by number of nights and by number of nightmares, it was found that they are each other's biggest predictor. In other words, when exploring nightmare frequency by number of nights, those who have nightmares most frequency are the same individuals who will be experiencing nightmares on most nights, and vice versa. In terms of nightmare distress, negative emotions were found to be what best predicts how much distress is experienced in individuals' nightmares. This suggests that those who experience a significant amount of negative emotions in their daily lives are much more likely to experience distress in their nightmares, which can also cause distress in their daily lives as well, providing support for the continuity hypothesis (DeCicco et al., 2010; DeCicco et al., 2012).

In terms of regression analyses exploring information coded in the participant nightmares, for nightmare frequency, there was only one variable throughout the stepwise multiple regression analysis that was significant, which was nightmare frequency by number of nights. Interestingly enough, this suggests that those who experience nightmares frequently are also more likely to report that they have the same recurring nightmare. Further, for nightmare distress, it was found that agreeableness coded in nightmares was what predicted this variable most often, potentially suggesting that those who are more agreeable in their nightmare also experience more distress as a result of their nightmares.

Throughout the current study, many findings differed from previous research and deserve to be discussed. For one, it was hypothesized that factors such as higher waking day stress, higher neuroticism, and greater negative emotions would influence not only nightmare distress, but also nightmare frequency. However, the current study only found support for those three factors in terms of nightmare distress. This is inconsistent with findings from Schredl et al. (2014), Zadra and Donderi (2000), and Robert and Zadra (2014), who found that greater stress experience in waking day, higher scores on neuroticism, and more negative emotions, such as anger and sadness, were related to the frequency with which one experiences nightmares. This is surprising, as many forms of previous research have found results consistent with the above researchers. However, the current sample size was quite small, and most participants were in their early twenties, so the participants certainly do

not cover a wide range of individuals. As a result, during this age group, individuals may pay greater attention to how distressing their nightmare is and how memorable the occurrence is to them, rather than how frequently they are experienced.

In addition, a number of surprising results appeared. For example, the current study found that higher scores on conscientiousness and openness to experience led to greater nightmare frequency. Similar results were found from Schredl and Göritz (2017). In their research, they found that participants with greater openness to experience, neuroticism, and conscientiousness had greater dream recall frequency (Schredl & Göritz, 2017). In terms of the current study, it is possible that participants who scored higher on conscientiousness and openness to experience had greater recall of their nightmares and how frequently they occur because of attributes that are consistent with those two factors. Conscientiousness is associated with planning and goal-directedness, while openness to experience is described as being open-minded and being curious about the depth of something (John & Srivastava, 1999). As a result, participants may recall their nightmares more often so as to try to plan out how to approach the situation in the nightmare differently the next time it occurs.

While the present study did investigate waking day stress, personality, and emotions, as well as their influence on nightmare frequency and distress, there are a number of limitations to be addressed. First, considering the credits that were given out, only those that were in Professor DeCicco's online introductory courses to Psychology could participate, which significantly limited the amount of individuals able to take part. In addition, considering it was an introductory course, many of the participants were in their late teens and early twenties, making the results difficult to generalize. Third, as a result of the limited available participation, the sample size was small, suggesting that future researchers include a larger number of participants.

Overall, the present study provided information on a topic that had not yet been taken into consideration as an entire whole, ultimately extending on findings by researchers such as Schredl et al. (2014), Schredl and Göritz (2017), and Robert and Zadra (2014). As a result, the study provides a foundation for future researchers to investigate the similar idea, and even extend on the findings found here. With that being said, though, previous research has taken into consideration some predictors of nightmare frequency and distress, but have used different measures. For example, when measuring personality traits in their own study, Schredl et al. (2009) used the NEO-FFI, rather than the Big Five Inventory (John & Srivastava, 1999) that was used in the current study. In addition, when measuring nightmare frequency, Schredl et al. (2009) used an eight-point scale, asking the participant how often they experience nightmares, with responses such as *'(2) About once a year'* or *'(4) About once a month'*. In difference, the current study used the Nightmare Frequency Questionnaire (Krakow et al., 2000) which assessed how frequently an individual has nightmares, comparing how many nights as well as how many nightmares, as one can experience multiple nightmares a night, an individual experienced. In sum, the present study did not find any significant results relevant to increased nightmare frequency. However, the study did find that waking day stress, neuroticism, and negative emotions are significant factors contributing to the distress experienced in nightmares, indicating that, if individuals can eliminate these factors from their waking day lives, they will also be able to decrease distress experienced in their nightmares, and ultimately in their lives.

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Appendix

Table 2. Stepwise Multiple Regression for NFQ_N with CONS, NFQ_NM, NDQ, NM_CONS, and NM_FREQ

								Partial r's			
Step	Variable Entered	R	R²	Adjusted R²	R² Change	SE	CONS	NFQ_ NM	NDQ	NM_ CONS	NM_ FREQ
0	None					76.97	.33*	.40**	.48**	.40**	.49***
1	NM_FREQ	.49	.24	.22	.24	67.77	.31*	.47**	.44**	.41**	
2	NFQ_NM	.64	.41	.38	.17	60.46	.33*		.54***	.34*	
3	NDQ	.76	.58	.55	.17	51.60	.27			.08	

Note. CONS = Contentiousness; NFQ_NM = Nightmare Frequency Questionnaire – Number of Nightmares; NDQ = Nightmare Distress Questionnaire; NM_CONS = Conscientiousness in Nightmares; NM_FREQ = Frequency of Nightmares in Nightmares. * p < .05. ** p < .01. *** p < .001

Table 3. Stepwise Multiple Regression for NFQ_NM with EXT, OPEN, and NFQ_N

							Partial r's		
Step	Variable Entered	R	R²	Adjusted R²	R² Change	SE	EXT	OPEN	NFQ_N
0	None					1136	-.39*	.31*	.40**
1	NFQ_N	.40	.16	.14	.16	1055	-.31*	.22	
2	EXT	.49	.24	.20	.08	1017		.18	

Note. EXT = Extraversion; OPEN = Openness; NFQ_N = Nightmare Frequency Questionnaire – Number of Nights. * p < .05. ** p < .01. *** p < .001

Table 4. Stepwise Multiple Regression for NDQ with PSS, NEUR, NEG_EMOT, NFQ_N, and NM_CONS

								Partial r's			
Step	Variable Entered	R	R²	Adjusted R²	R² Change	SE	PSS	NEUR	NEG_ EMOT	NFQ_N	NM_ CONS
0	None					8.57	.40**	.39**	.53***	.48**	.49***
1	NEG_EMOT	.53	.28	.27	.28	7.35	.10	-.01		.47**	.39**
2	NFQ_N	.66	.44	.42	.16	6.55	.22	.14			.27

Note. PSS = Perceived Stress Scale; NEUR = Neuroticism; NEG_EMOT = Negative Emotions; NFQ_N = Nightmare Frequency Questionnaire – Number of Nights; NM_CONS = Conscientiousness in Nightmares. * p < .05. ** p < .01. *** p < .001

Table 5. Stepwise Multiple Regression for NM_DIST with OPEN, NM_STRESS, NM_AGREE, and NM_NEUR

							Partial r's			
Step	Variable Entered	R	R²	Adjusted R²	R² Change	SE	OPEN	NM_ STRESS	NM_ AGREE	NM_ NEUR
0	None					.70	.31*	.38*	.55***	.34*
1	NM_AGREE	.55	.30	.28	.30	.59	.29	.27		.32*
2	NM_NEUR	.61	.37	.34	.07	.57	.34*	.26		
3	OPEN	.66	.44	.40	.07	.54		.23		

Note. OPEN = Openness; NM_STRESS = Stress Coded in Nightmares; NM_AGREE = Agreeableness in Nightmares; NM_NEUR = Neuroticism in Nightmares. * p < .05. ** p < .01. *** p < .001