Personality correlates of the self-rated frequency of erotic dreams

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Summary. Erotic dreams have been of interest for researchers and the public alike. Although, the gender difference in the frequency of erotic dreams is well documented with men reporting erotic dreams more often than women, studying other factors, for example, personality traits, in relationship with erotic dreaming is scarce. Overall, 1711 participant estimated the percentage of erotic dreams with regard to all their remembered dreams and also completed a Big Five Personality inventory. The findings indicate that four of the Big Five personality factors were related to the frequency of erotic dreams; although the effects sizes of these associations were small. As expected, openness to experience correlated with a higher frequency of sexual dreams, as this personality trait is related to more frequent positive sexual cognitions and pornography consumption. Whereas extraversion and neuroticism were also positively related to erotic dream frequency, agreeableness showed a negative relationship. These kinds of studies help to understand how waking life sexuality affect erotic dreams, and in more general terms, how waking life is reflected in dreams.

Keywords: Erotic dreams, dream recall frequency, openness to experience, extraversion, neuroticism

1. Introduction

Sexual dreams and their meanings are already mentioned in the Oneirocritica written by Artemidorus of Daldis in the 2nd century AD, for example, having sex with an unknown beautiful woman predicts substantial accomplishments (Harris-McCoy, 2012). The first large-scale studies on human sexual behavior (Kinsey, 1953; Kinsey, Pomeroy, & Martin, 1948) indicated that most of the participants have had sexual dreams. The first systematic content analytic study investigating the frequency and nature of erotic dreams (erotic dreams include sexual activities but also kissing and dating) was carried out by Hall and Van de Castle (1966). They found that 3.6% of the 500 dreams reported by 100 female college students included erotic topics whereas 11.6% of the male college students' dreams included erotic themes; the effect size for this gender difference was 0.313. In subsequent studies (Domhoff, Meyer-Gomes, & Schredl, 2005-2006; Geißler & Schredl, 2020; Hall, Domhoff, Blick, & Weesner, 1982; Maggiolini, Cagnin, Crippa, Persico, & Rizzi, 2010; Rainville & Rush, 2009; Schredl, Paul, Lahl, & Göritz, 2010-2011; Schredl, Sahin, & Schäfer, 1998; Zadra & Gervais, 2011), the gender difference was smaller (overall effect size of 0.106) but significant (Schredl, Geißler, & Göritz, 2019). Whereas content analytic studies yielded about 5% to 10% of erotic themes in the dream reports, studies using retrospective estimates of the percentages of erotic dreams with regard to all remembered dreams reported a higher percentage of erotic dreams ranging from 18% to 21% (Schredl, Desch, Röming, & Spachmann, 2009; Schredl et al., 2019). One might speculate that some participants might be uncomfortable to record a detailed erotic dream – even if anonymity is guaranteed. On the other hand, intensive erotic dreams might be better remembered than mundane dreams, i.e., retrospective measure of erotic dream frequency might produce overestimations. In view of these arguments, it seems plausible that the "true" frequency of erotic dreams is somewhere in-between.

Interestingly, there is little research into factors that might be associated with the frequency of erotic dreams; besides the above reported gender difference. Schredl et al. (2009) found that erotic dream frequency was not related to the frequency of sexual activities but to the frequency of sexual fantasies during the day. This relationship might help to explain the gender differences in erotic dreaming as men also report more frequent sexual fantasies in waking than women (Fisher, Moore, & Pittenger, 2012; Leitenberg & Henning, 1995); interestingly men also think more about food and sleep, that is, personal needs (Conley, Moors, Matsick, Ziegler, & Valentine, 2011). The frequencies of erotic dreams were similar in persons with stable partnerships compared to singles; solely in widowed persons the frequency was reduced (Schredl & Göritz, 2020). In these analyses, age was statistically controlled as erotic dream frequency declined with age in a non-student sample with a large age range (Schredl et al., 2019; Schredl et al., 2010-2011).

Several studies (Heaven, Fitzpatrick, Craig, Kelly, & Sebar, 2000; Lobell, Moluski, Sibblies, & Youse, 2016; Meltzer & McNulty, 2016; Moyano & Sierra, 2013; Shafer, 2001; Velten, Brailovskaia, & Margraf, 2019) looked into the relationship between the big five personality factors and sexual behavior. Openness to experience, for example, was related to more frequent positive cognitions related to sexuality (Moyano & Sierra, 2013), higher consumption of pornography (Lobell et al., 2016), and sexual function (having orgasms, being satisfied) in couples (Velten et al., 2019),

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whereas neuroticism was related to sex-related anxieties and less satisfying sexual relationships (Heaven et al., 2000; Velten et al., 2019). Agreeableness in the female partner was related to the frequency of intercourse in young couples (Meltzer & McNulty, 2016). So far, only one study (Geißler & Schredl, 2020) investigated whether personality traits were related to erotic dreaming. Interestingly, openness to experience was related to the frequency of erotic dreams (Geißler & Schredl, 2020) – possibly reflecting the relationship between openness to experience and positive sexual cognitions in waking (Moyano & Sierra, 2013). On the other hand, neuroticism and conscientiousness were related with negative emotions related to erotic activities within in the dreams – also reflecting the relationship between neuroticism and sexual behavior in waking (Heaven et al., 2000). However, the sample of Geißler and Schredl (2020) was a student sample with an age mean of 23.40 ± 5.41 yrs.; thus the generalizability of these findings is limited.

The aim of the present study was to study the relationship of the big five personality factors and the frequency of erotic dreams in a sample with large age range and broad educational background. Given the link between erotic fantasies in waking and erotic dreaming, it was expected that openness to experience would correlate positively with erotic dream frequency as openness is also related to more frequent positive sexual cognitions in waking (Moyano & Sierra, 2013). For the four other factors (extraversion, neuroticism, agreeableness, and conscientiousness) the analyses were exploratory in nature.

2. Method

2.1. Participants

Overall, 1711 persons (973 women, 738 men) with the mean age of 47.80 ± 14.19 years participated in both surveys completing the items measuring dream recall frequency, nightmare frequency, the subjective estimated of the percentage of erotic dreams, and the personality inventory (NEO-FFI 30). This is a subset of the study by Schredl et al. (2019). Educational levels were distributed as follows: 9 participants did not finish school, 177 went to school for 9 years ("Hauptschule"), 509 for 10 years ("Mittlere Reife"), 436 for 12 – 13 years ("(Fach-)Hochschulreife"), 534 for 16 – 18 years ("(Fach)Hochschulstudium") and 46 participants had doctoral degrees.

2.2. Research Instrument

Dream recall frequency was measured with a seven-point scale (coded as 0 = never, 1 = less than once a month, 2 = about once a month, 3 = about 2 to 3 times a month, 4 = about once a week, 5 = several times a week, 6 = almost every morning) with a high retest reliability (r = .756; Schredl, Berres, Klingauf, Schellhaas, & Göritz, 2014).

An eight-point scale was used for measuring nightmare frequency (0 = never, 1 = less than once a year, 2 = about once a year, 3 = about 2 to 4 times a year, 4 = about once a month, 5 = about 2 to 3 times a month, 6 = about once a week, and 7 = several times a week). A definition for nightmares based on the ICSD-3 (American Academy of Sleep Medicine, 2014) was presented: "Nightmares are dreams with strong negative emotions that result in awakening from the dreams. The dream plot can be recalled very vividly upon awakening."(Schredl et al., 2014). The retest reliability for a four-week interval was high: r = .75 (Stumbrys, Erlacher, & Schredl, 2013).

The participants were asked to estimate the percentage of erotic dreams with regard to all of their remembered dreams. The following definition was used: 'An erotic dream element can be any occurrence of sexually motivated actions such as flirting, kissing, intercourse or masturbation as well as watching sexual actions.' No specific time interval for the retrospective estimation was specified. This item had a reliability for a two-week retest interval of r = .729 (N = 2292) (Schredl et al., 2019).

The big five personality factors were measured with the German version of the NEO-FFI-30, which includes 30 Items (Körner, Drapeau, et al., 2008). Each personality factor (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) were computed as the sum score of the six corresponding items. The internal consistencies (Cronbach's alpha) of the five scales of the 30 item version were comparable to those of the 60 item version of the NEO-FFI and ranged from r = .67 (openness to experience) to r = .81 (neuroticism) (Körner, Geyer, et al., 2008). In addition, the retest reliability over a two-year interval is very high: r = .798 for neuroticism (Schredl & Göritz, 2021) and r = .722 to r = .797 for the other four personality factors (unpublished data in the same sample).

2.3. Procedure

The link for the study was sent to all members (about 10,000 at that time) registered within an online panel (www.wisopanel.net). All participants that responded to the survey carried out from April 18th, 2014 to April 29th, 2014 and the survey carried out between March 23, 2015 and April 8, 2015 were included. The dream-related questions were part of the first survey, whereas the second survey one year later included the personality questionnaire. This panel consists of German speaking persons with heterogenic demographic backgrounds who are interested in online studies. Most of the participants live in Germany, some in Austria, Switzerland, and very few in other countries.

The SAS 9.4 software package for Windows (SAS Institute, Cary, North Carolina, USA) was used for statistical analyses. To analyze the effect of socio-demographic, dream, and personality variables on the estimated percentages of erotic dreams ordinal regressions (cumulative logit analyses) were applied. The SAS "Logistic" procedure provides an adjusted pseudo-R2 according to Nagelkerke which is roughly comparable to R2 in parametric regressions. Effect sizes for each variable included in the ordinal regression were computed using Chi-Square values according to formula given by Cohen (1988).

3. Results

The distribution of dream recall frequencies is depicted in Table 1. Most of the participants (almost 60%) remember dreams at least once a week. The mean of the estimate regarding the percentage for erotic dreams in relation to all remembered dreams was about 17.07%. Erotic dreams have been experienced by the majority of participants (82.87%); ranging from low frequencies (less than 5%) to high frequencies (above 40%) (see Table 2).

The means of the five personality dimensions were as follows: Neuroticism 1.43 ± 0.91 (N = 1711), extraversion 2.10 ± 0.66 (N = 1708), openness to experience 2.43 ± 0.74

Table 1. Dream recall frequency (N = 1711)

Category	Frequency	Percent
Almost every morning	162	9.47%
Several times a week	516	30.16%
About once a week	331	19.35%
About 2 to 3 times a month	240	14.03%
About once a month	121	7.07%
Less than once a month	231	13.50%
Never	110	6.43%

Table 2. Estimates of categorized erotic dream percentage estimates within the sample (N = 1699)

Percentage of erotic dreams (categorized)	Frequency	Percent
> 40%	186	10.95%
20.01% to 40%	255	15.01%
10.01% to 20%	325	19.13%
5.01% to 10%	294	17.30%
0.01% to 5%	323	19.01%
0%	316	18.60%

(N = 1709), agreeableness 2.88 ± 0.66 (N = 1708), and conscientiousness 2.97 ± 0.60 (N = 1711).

The ordinal regression analysis with all depicted variables entered simultaneously showed that four of the Big Five personality factors were related to the self-rated frequency of erotic dreams (small effect sizes) (see Table 3). Persons with higher neuroticism, extraversion, and openness to experiences scores and lower agreeableness scores reported slightly higher percentages of erotic dreams. Conscientiousness was not significantly associated with erotic dream frequency. Similar to the total sample of N = 2929 (Schredl et al., 2019), age was negatively associated with the estimates of erotic dream percentage, whereas men reported higher percentages than women. Moreover, persons with high dream recall were also more likely to report higher estimates of erotic dream percentages. Adding nightmare frequency to the regression (Analysis 2 in Table 3) did not affect the relationship patterns seen in Analysis 1, and nightmare frequency itself was not related to the percentage of erotic dreams.

4. Discussion

The present results indicate that four of the Big Five personality factors were related to the frequency of erotic dreams; although the effects sizes of these associations were small. As expected, openness to experience correlated with a higher frequency of sexual dreams. Whereas extraversion and neuroticism were also positively related to erotic dream frequency, agreeableness showed a negative relationship.

The first methodological issue that should be addressed is the retrospective method used in this study to elicit erotic dream frequency. As retrospective measures might be prone to memory biases, e.g., intense erotic dreams are better recalled days, weeks, or months after their occurrence, one might then assume that the percentages reported in this study might be overestimations. However, one has to take into account that dream content analytic studies might produce underestimations due to privacy issues. For the topic of sport dreams, it could be shown that influencing factors like studying sports vs. studying psychology had similar associations to the percentage of sport in diary dreams compared to a study using a retrospective measure like in this study (Erlacher & Schredl, 2004; Schredl & Erlacher, 2008). That is, the measurement method might not have a strong effect on the associations of erotic dream frequency with other variables. For example, age (decrease with age) and gender effects (men reporting more erotic dreams than women) were found in dream content analytic studies (Hall & Van de Castle, 1966; Schredl et al., 2010-2011) and studies using retrospective measures eliciting the percentage of erotic dreams (Schredl et al., 2009; Schredl et al., 2019).

The next issue is related to the sample characteristics. The participants registered if they are interested in online studies and elected to participate in this dream study, thus

Table 3. Ordinal regression for the categorized estimates of the percentage of erotic dreams (N = 1691)

Variable	**Analysis 1**				**Analysis 2**			
	SE	χ^2	p	Effect size	SE	χ^2	p	Effect size
Age	-.2295	78.2	<.0001	0.440	-.2260	74.7	<.0001	0.430
Gender (1 = f, 0 = m)	-.2204	72.6	<.0001	0.424	-.2216	73.1	<.0001	0.425
Education	-.0171	0.5	.4852	0.034	-.0177	0.5	.4695	0.034
Dream recall frequency	.2986	131.5	<.0001	0.581	.2845	99.4	<.0001	0.400
Nightmare frequency					.0327	1.2	.2640	0.053
Neuoticism	.0839	8.1	.0045	0.139	.0745	5.9	.0150	0.118
Extraversion	.0716	7.0	.0081	0.129	.0715	7.0	.0082	0.129
Openness to experience	.0553	4.7	.0198[1]	0.106	.0550	4.7	.0153[1]	0.106
Agreeableness	-.0698	6.9	.0087	0.128	-.0696	6.8	.0090	0.127
Conscientiousness	.0409	2.3	.1320	0.074	.0409	2.3	.1320	0.074
		R^2 = .1820				R^2 = .1826		

SE = Standardized estimates, [1]one-tailed

the sample showed considerably higher dream recall compared to representative samples (Schredl et al., 2014). As erotic dream frequency was related to dream recall frequency, the percentages of erotic dreams would be lower if representative samples were studied.

Lastly, the personality dimensions were measured one year after the participants completed the dream questionnaire. Within the same panel, 888 participants (495 women, 393 men) with a mean age of 50.77 ± 13.74 yrs. completed the NEO-FFI-30 in 2015 and 2017 (Schredl & Göritz, 2021). The stability coefficients were very high: r = .798 (neuroticism), r = .747 (extraversion), r = .797 (openness to experience), r = .722 (agreeableness), and r = .724 (conscientiousness) – reflecting a similar magnitude reported by the test authors (Körner, Drapeau, et al., 2008; Körner, Geyer, et al., 2008). In addition, means did not differ between the two measurement points, with the exception of a very small but significant reduction in neuroticism (2015: 1.38 ± 0.92 to 2017: 1.34 ± 0.89, t = -2.1, p = .0384). So, one can assume that the delayed measurement did not bias the findings.

Most of the participants (about 80%) reported that they had erotic dreams at least once; a figure that matches with previous findings (Kinsey, Pomeroy, Martin, & Gebhard, 1959; Nasser & Bulkeley, 2009; Nielsen et al., 2003; Schredl, Ciric, Götz, & Wittmann, 2004; Yu, 2008). As mentioned above, the averaged percentage of 17% of the remembered dreams that include erotic themes (Schredl et al., 2019) might be lower if representative samples were studied. However, representative samples of participants reporting dreams that can be content analyzed – in order to obtain the percentage of dream reports with erotic dreams – are still lacking; most content analytic studies (Geißler & Schredl, 2020; Hall et al., 1982; Hall & Van de Castle, 1966) are based on student samples.

As expected, there was a small but significant correlation between openness to experience and the reported percentage of erotic dreams. It would be very interesting to study whether the frequency of sexual cognitions (Moyano & Sierra, 2013) or consumption of pornography (Lobell et al., 2016) might moderate this relationship – as frequency of sexual fantasies in waking were related to the frequency of erotic dreams (Schredl et al., 2009).

The link between neuroticism and the percentage of erotic dreams seems at first counterintuitive. First, nightmare frequency was partialled out because neuroticism was related to negative experienced sexuality in dreams (Geißler & Schredl, 2020), but the relationship was unchanged. Sexual abuse in childhood which is related to more frequent negative erotic dreams (Belicki & Cuddy, 1996) and also to neuroticism in adulthood (Boillat et al., 2017) seems not to explain the relationship between neuroticism and the percentage of erotic dreams. It would be very interesting to include a measure of emotional tone of these erotic dreams in future studies. One hypothesis is that persons with high neuroticism also dream about their anxieties and worries that are related to sexuality (Heaven et al., 2000). The small but significant association with extraversion seems more plausible as sexual activity includes partners (except for masturbation and sexual fantasies) and, in general, extraverted individuals are seeking interpersonal contact more often (Shiraev, 2017). Lastly, the negative relationship between agreeableness and erotic dream frequency does not fit into the finding that – at least for women – agreeableness is related to a more satisfying sexual life within a stable relationship (Meltzer & McNulty, 2016). One might speculate as to whether the sex partner within the dream (current partner or strange man/woman) might help to explain this, as it might be possible that individuals with high agreeableness might dream less often about having erotic contact with a person that is not their partner.

To summarize, the findings indicate that personality is related to the frequency of erotic dreams, even though the effects are relatively small. Nevertheless, the reported association highlighted several pathways on how erotic dreaming – and dreaming in general – is related to waking life. To get a deeper understanding of these relationships, future studies should include measures regarding the content of erotic dreams (emotions, familiarity of partners) and frequency of sexual behavior during waking life. For example, the largest effect sizes for gender differences were found for masturbation frequency (d = 0.53) and pornography consumption (d = 0.63) (Petersen & Hyde, 2010), that is, these waking-life variables might be helpful in explaining the gender difference in erotic dream frequency. Although this study focused on dream theories like the continuity hypothesis of dreaming, it would be interesting to investigate the possibility whether research into erotic dreaming can help to understand gender differences in waking-life, e.g., Conley et al. (2011) discussed that the frequency of sexual thoughts in waking life might be not specific but reflect a broader style focusing on personal needs (e.g., food, sleep) in men whereas women are socialized to be both more attuned to others' needs. That is, it would be interesting to take a closer look at other dream topics as they might be related to erotic dream frequency.

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