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NIGHTMARE FREQUENCY AND FEMININITY/MASCULINITY[1, 2]

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Summary.—Several large-scale studies showed that women tend to report nightmares more often than men. Despite this robust finding, empirically tested interpretations of these sex differences are lacking. Levin and Nielsen put forward the hypothesis that sex-specific socialization might be one of the risk factors for nightmare occurrence. The present findings of an online survey indicate that expressivity/femininity and instrumentality/masculinity were related to nightmare frequency and, thus, supported this hypothesis. Since the sex difference in nightmare frequency was not fully explained by these two variables, future studies should investigate other variables—in addition to sex-role orientation—like depressive symptoms, history of sexual and/or physical abuse, ruminative coping styles, and physiological measures of processing emotional stimuli within the brain.

Nightmares are defined as disturbing mental experiences that generally occur during REM sleep and often result in awakening (ICSD–2; American Academy of Sleep Medicine, 2005). About 5% of the adult population state that they suffer from nightmares (Bixler, Kales, Soldatos, Kales, & Healey, 1979). Several large-scale studies reported a marked sex difference—women report nightmares more often than men—with moderate effect size range $d = 0.29$ ($N = 3{,}433$; Levin, 1994) to $d = 0.44$ ($N = 4{,}812$; Choquet, Tesson, Stevenot, Prevost, & Antheaume, 1988). Comparable effect sizes for the sex difference in nightmare frequency were found for Internet-based studies with large samples ($d = 0.27$, $N = 23{,}990$, Nielsen, Stenstrom, & Levin, 2006; $d = 0.56$, $N = 634$, Schredl & Erlacher, 2007). Despite this robust finding of a sex difference in nightmare frequency, possible explanatory factors have not been studied empirically. To be considered, a factor should meet two minimal criteria: first, it should correlate with dream nightmare frequency, and second, the factor should show a marked sex difference itself. Levin and Nielsen (2007) proposed several such factors, like occurrence of depressive disorders, sexual and physical abuse, ruminative style of coping, and psychosocial risk factors like low instrumentality.

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To test the hypothesis put forward by Levin and Nielsen (2007) that sex-specific socialization might be one of the risk factors for nightmare occurrence, the present study investigated the effect of femininity and/or masculinity on nightmare frequency in addition to biological sex. It was expected that feminine gender-role orientation would be related to increased nightmare frequency whereas masculine gender-role orientation would be associated with lower nightmare frequency.

Method

Research Instruments

For eliciting nightmare frequency, a 7-point scale (coded as 0 = Never, 1 = Less than once a year, 2 = About 2 to 4 times a year, 3 = About once a month, 4 = About 2 to 3 times a month, 5 = About once a week, 6 = Several times a week) was presented. To obtain units of nightmares per month, the scale was recoded using the class means of the seven categories (0: 0, 1: 0.042, 2: 0.25, 3: 1.0, 4: 2.5, 5: 4.0, 6: 12.0).

In addition to eliciting age and sex, the participants were asked to complete the "Skalen zur Erfassung der Geschlechtstypizität (Scales measuring gender stereotypes; GTS+), a questionnaire based mainly on the items of the Bem Sex Role Inventory (Bem, 1974) and measuring sex role orientation along two dimensions: expressivity/femininity and instrumentality/masculinity (Altstötter-Gleich, 2004). For each dimension, eight items were presented with the 4-point response categories 1: Rarely, 2: Sometimes, 3: Often, and 4: Almost always. Examples for the expressivity/femininity scale are: "Typically I am empathic" or "Typically I am sensitive." Items for the instrumentality/masculinity scale are: "Typically I am assertive" or "Typically I am self-confident." The eight items' ratings were averaged for each scale. Reliability (Cronbach's alpha) of the scale was reportedly good (Cronbach's alpha = .79 for expressivity and .83 for instrumentality) and construct validity has been demonstrated by confirmatory factor analyses (Altstötter-Gleich, 2004).

Procedure and Participants

Overall, 4,197 persons (2,665 women, 1,532 men) completed the online survey between October 10, 2008, and November 20, 2008. The mean age of the sample was 34.3 yr. (SD = 14.8). The link for the study was posted on different web sites (www.yougov.de, www.panopia.de, www.studivz.net) where people who are interested in participating in online surveys can register. Sometimes, prizes or money are offered for study participation, but this study was completely voluntary and unpaid. Several measures were undertaken to minimize false data entries. First, repeated data entries within a short time interval from the same IP address were not

allowed. Second, only questionnaires completed in an appropriate time window were included. Lastly, a visual plausibility check was carried out for the questionnaire items, e.g., if items were all rated the same (e.g., all zero) the data set was excluded.

Results and Discussion

For the total sample, the mean nightmare frequency (recoded scale) was 1.80 ($SD = 2.96$), i.e., the participants remembered nightmares about twice a month. The sex difference had a moderate effect size: $d = 0.41$ (original scale). This is comparable with effect sizes obtained from questionnaire studies ($d = 0.31$; $N = 444$; Schredl, 2003). The GTS+ mean scores of this online sample were comparable to the values given by Altstötter-Gleich (2004) for her validation sample (see Table 1).

TABLE 1
Means and Standard Deviations of the Gender Stereotypes Questionnaire (GTS+)

Variable	Present Sample ($N = 4,197$)		Validation Sample ($N = 409$)	
	M	*SD*	*M*	*SD*
Age	34.3	14.7	33.1	14.8
Expressivity, women	3.04	0.56	3.02	0.54
Expressivity, men	2.73	0.57	2.69	0.50
Instrumentality, women	2.52	0.56	2.40	0.51
Instrumentality, men	2.73	0.57	2.68	0.54

Note.—Validation sample is from Altstötter-Gleich (2004).

The results of the logistic regression (computed due to the ordinal measurement level of the scale) are depicted in Table 2. As predicted, Expressivity and instrumentality correlated positively and negatively, respectively, with nightmare frequency. The simple Spearman Rank correlations between nightmare frequency and the four variables were as follows: $r = -.30$ (age), $r = .20$ (Sex, 1 = female, 0 = male), $r = .12$ (Expressivity), and $r = -.12$ (Instrumentality; all ps $< .0001$). Overall, the four variables explained about 12% of the variance. This supports the hypothesis put forward by Levin and Nielsen (2007) that sex-specific socialization is a risk factor for nightmare occurrence. However, sex was still significant when the femininity/masculinity variables were entered into the analysis, clearly indicating that femininity and masculinity do not explain the sex difference in nightmare frequency and that other factors are contributing to nightmare frequency. These might be of a psychological nature like sex-related coping styles (rumination) and proneness to depressive disorders, or of a physiological nature like differences in processing emotional stimuli within the brain (cf. Levin & Nielsen, 2007). It would be interesting to study the effect of sleep-related parameters like the amount of REM sleep,

TABLE 2
LOGISTIC REGRESSION FOR NIGHTMARE FREQUENCY

Variable	Nightmare Frequency		
	Standardized Estimate	χ^2	OR
Age	−.27	283.1	0.97
Sex	.11	48.9	0.65
Expressivity	.07	20.4	1.25
Instrumentality	−.07	22.6	0.79

Note.—All chi-squared values significant at $p < .0001$. OR: odds ratio (assumption of proportional odd ratios); $R^2_{adj} = .12$ (all four variables were entered simultaneously into the regression).

arousal frequency, and sleep quality or hormones like estrogen on the sex difference in nightmare frequency.

The decline of nightmare frequency with age (see Table 2), in line with previous findings (Salvio, Wood, Schwartz, & Eichling, 1992), supports—in addition to the comparable GTS+ figures and the effect size of the sex difference in nightmare frequency—the validity of the Internet-based study.

To summarize, sex-specific socialization reflected in the masculinity and femininity dimensions probably explain partly the often found sex difference in nightmare frequency, but future studies have to include other variables like depressive symptoms, life events (history of sexual and/or physical abuse), coping styles (ruminative, emotion-focused), and physiological measures of processing emotional stimuli within the brain to explain the sex difference in nightmare frequency fully.

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