

The Impact of Early-Life Maltreatment on Dreams of Patients with Insomnia

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Summary. There is ample evidence that bad dreams and post-traumatic nightmares are a common consequence of exposure to traumatic events both among children and adults. The aim of the present study was to examine to what extent early-life maltreatment experiences are associated with dreams even many years later in adulthood. 37 patients suffering from primary insomnia recorded their dreams for seven consecutive days at home, and completed self-report questionnaires assessing childhood trauma, current level of stress, and depressive symptoms. Dream content analyses were carried out. Even in consideration of current stressors and depressive symptoms which also were related to dream content, childhood maltreatment experiences proved to be important predictors of less positive dream emotions and more negative themes in dream. These findings are consistent with the results of other studies indicating that traumatic events can have strong and long-lasting effects on dream emotions and dream content. Longitudinal studies are needed to identify how and why dreams develop over time as a consequence of traumatic experiences.

Keywords: Dream Content; Dreaming; Abuse; Neglect; Childhood Maltreatment; Trauma

1. Introduction

The majority of people being or having been exposed to extreme stress situations reports in consequence negative effects on sleep and dreaming. This association is especially strong after the confrontation with traumatic events in which the affected persons had to fear for life or their physical integrity and experienced intensive fear, helplessness and horror. In several studies investigating war veterans and crime victims, difficulties initiating and maintaining sleep as well as increased occurrence of anxiety dreams and nightmares were among the most common symptoms reported (e.g., Krakow et al., 1995, 2002; Mellman et al., 1995, 2001; Neylan et al., 1998; North et al., 1999; Ohayon & Shapiro, 2000; van der Kolk et al., 1984). Similarly, Najam et al. (2006) found that earthquake survivors had more emotional, unpleasant, horrifying, and hostile dreams in the aftermath of the disaster compared to a control group. Sleep continuity disturbances and recurrent nightmares also are part of the diagnostic criteria for acute stress disorder and posttraumatic stress disorder. The frequency and intensity of such trauma-related dreams decreases over the course of time (Cernovsky, 1987; Terr et al., 1999), but they can also persist for more than 40 years after the stressful events have occurred (Lavie & Kaminer, 1991; Rosen et al., 1991; Schreuder et al., 2000).

The response of children to traumatic events is similar to that of adults. An increased occurrence of nightmares and anxiety dreams has been reported in children who were affected by a sniper attack (Pynoos et al., 1987, 1993), natural disaster (Dollinger, 1985), war experiences (Masalha, 2003; Nader, 1996; Punamäki et al., 2005), burn injuries (Kravitz et al., 1993; Stoddard et al., 1996), and road traffic accidents (Ellis et al., 1998). In the dreams of Palestinian children living in Gaza under violent conditions, Punamäki (1997, 1998) found more aggression, more persecutions, and more negative emotions than in the dreams of children living in a more peaceful area in Galilee. Similarly, a study by Valli et al. (2005) showed that dreams of traumatized children included a significantly higher number of threatening dream events incorporating more aggression than the dreams of non-traumatized children. In a study by Chambers and Belicki (1998) university undergraduates having experienced abuse and/or neglect prior to age of 14 years reported significantly more nightmares in adult age than persons reporting no experiences of this kind. The result of this study provides further evidence that the emotional strains experienced in early life can lead to an increased incidence of nightmares several years later.

The goal of the present study was to explore to what extent early-life maltreatment experiences in the form of abuse or neglect are related to negative dream emotions and negatively toned dream themes even many years later in adulthood. For this purpose, diary dreams of adult primary insomnia patients were collected for seven consecutive days at home. We hypothesized that childhood maltreatment experiences are associated with increased negative dream emotions and more negatively toned themes such as negative self-description, aggression, threat, and stress.

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2. Method

2.1. Participants

The persons participating in this study also were part of another study having examined associations between adverse childhood experiences and both polysomnographically and actigraphically assessed sleep in insomnia patients as described in Bader et al. (2007a, b).

Included in the study were 59 patients (14 men, 45 women, age: 43.6 ± 8.8 years) diagnosed for primary insomnia according to DSM-IV criteria (APA, 1994). Patients being suspected of suffering from other sleep disorders (e.g., narcolepsy, sleep apnea, restless legs syndrome, circadian sleep disorders, or parasomnias) were excluded. Other exclusion criteria were: any mental disorder on Axis I, any clinical significant medical disease, current psychotherapy, and regular use of sleep medication or use of other sleep-affecting medication (e.g., sedatives, anxiolytics, antidepressants, neuroleptics, betablockers) for the last 4 weeks before study entry. Participants with irregular use of sleep medication (i.e., less than twice weekly) were permitted to participate in the study after a drug-washout period of at least 7 days.

Of the 59 participating persons, 37 (8 men, 29 women) contributed at least one dream for content analysis. Their mean age was 44.6 ± 9.1 years (range: 24-55 years). Overall, 116 dream reports were obtained.

2.2. Materials

2.2.1 Dream diary.

The participants were instructed to record their dreams each morning in a standardized dream diary for seven consecutive days at home. Furthermore, they were asked to rate for each dream positive and negative dream emotions on two five-point rating scales (0 = none, 1 = mild, 2 = moderate, 3 = strong, 4 = very strong).

2.2.2 Dream content analysis.

Dream emotions were scored by judges according to the Hall and Van de Castle (1966) classification system. For the present study the following emotions were assessed: anger, apprehension, happiness, and sadness. For the assessment of negative dream themes, three scales adopted from Schredl et al. (1998) were used: aggression directed at the dreamer, aggression directed by the dreamer at others, and negatives concerning the dream ego (e.g., low self-esteem or lack of something). Two additional scales were constructed by the authors of the present study: occurrence of threat to the dreamer, and occurrence of stress in the dream. The first scale measures the presence of threat to the physical or psychological integrity of the dreamer (e.g., violence against the dreamer, impending death of the dreamer, loss of a near person, serious illness, abasement, etc.). The second scale assesses whether there is any form of stress identifiable in dream (e.g., explicit mentions of being stressed, expressions of excessive demands, conflicts, pressure of time, etc.). All scales are bicategorical and score the presence or absence of the particular theme which the scale is designed to assess.

2.2.3 Childhood maltreatment experiences.

For the assessment of maltreatment experiences in childhood and adolescence the German version of the "Childhood Trauma Questionnaire" (Bernstein & Fink, 1998) was used. The CTQ is a 28-item self-report questionnaire comprising 5 subscales: physical, sexual, and emotional abuse, as well as physical and emotional neglect. Respondents are presented with a series of statements about childhood experiences (e.g., "When I was growing up I was punished with a belt, a board, or some other hard object") and are asked to choose from responses on a 5-point Likert-type scale that ranges from "never true" to "very often true". For each CTQ subscale a scale total score is calculated by summing the respective items, which ranges from 5 to 25. The higher the score, the more childhood maltreatment is being reported. Validation studies of the CTQ have demonstrated that self-reports on the CTQ-scales are highly stable over time and show good convergent and divergent validity with traumatic histories that have been ascertained by other measures (Bernstein & Fink, 1998). Bernstein and Fink (1998) established guidelines for classifying subscale scores depending on the severity of the abuse and neglect. These guidelines specify the range of scores that constitute "none to minimal", "low to moderate", "moderate to severe", and "severe to extreme" for each subscale.

2.2.4 Current level of stress.

To assess participants' current stress levels, two aspects of stress were considered: (a) critical life events in the last six months, and (b) the current stress level in several life domains. The occurrence of critical life events in the last six months was measured by means of the self-report inventory "Fragebogen zu kritischen Lebensereignissen" (FKL; questionnaire assessing critical life events; Bodenmann, 1998), which consists of 27 events such as unemployment, death of a close person, handicaps, illness, increased occupational demands, divorce etc.. Each item is rated on a dichotomous scale ("yes" / "no") with regard to the occurrence of the critical life event in the last six months. The level of stress resulting from this event is rated on a three-point scale (ranging from 1 = "slightly stressful" to 3 = "very stressful"). The total score is averaged over the 27 items, and ranges from 0 to 3, with higher scores indicating a greater occurrence of critical life events. The FKL has been validated in several studies and has a satisfactory discriminative validity (Bodenmann, 1998; Bodenmann et al., 2000).

The current level of stress was measured by the questionnaire "Allgemeines Stressniveau" (ASN; "general level of stress"; Bodenmann, 1998). In this 17-items self-report questionnaire, current levels of stress are assessed in several life domains such as partnership, work, household, child rearing, finances, social contacts, and well-being. Current stress (i.e., concerning the last week) in the different domains is rated on a five-point scale, ranging from "not at all" to "very severe". The total score is averaged over all items and ranges from 1 to 5, with higher scores indicating greater level of stress. Internal consistency of the ASN is satisfactory with Cronbach's $\alpha = 0.84$ (Bodenmann, 1998).

2.2.5 Depressive symptoms.

Current depressive symptomatology was measured by the German short version of the CES-D ("Center for Epide-

miological Studies Depression Scale"; Radloff, 1977), the "Allgemeine Depressions-Skala – Kurzform" (ADS-K; General Depression Scale – Short version; Hautzinger & Bailer, 1993). The ADS-K is a 15-item self-report scale designed to measure depressive symptoms in the general population. The items include depressed mood, somatic complaints, attention deficit, loss of energy, motivational deficits and negative patterns of thought. Participants rate the frequency of 15 symptoms over the past week on a four-point scale (ranging from "rarely" to "mostly"). The total score is calculated by summing all items, and ranges from 0 to 45, with higher scores indicating greater depressive symptomatology. The ADS-K has been validated in a study with the following samples: respondents from the general population (N=1298), 156 psychiatric patients mainly suffering from depression, 29 neurological patients and 105 patients suffering from chronic pain. Results support the validity and reliability of reports of current depressive symptoms obtained with the ADS-K (Hautzinger & Bailer, 1993).

2.3. Procedure

Participants were recruited via newspaper advertisements. Potential participants were interviewed by one of our clinical research coordinators. The interview included a semi-structured sleep-history interview to diagnose primary insomnia according to DSM-IV (APA, 1994), the German version of the "Structured Clinical Interview for DSM-IV/Axis I Disorders" (SCID-I; Wittchen et al., 1997) to evaluate the presence of other psychiatric disorders, a questionnaire to assess relevant somatic disorders, as well as a questionnaire to obtain demographic information. Participants were ruled out if they did not fulfill the inclusion criteria or if they met any exclusion criteria as described above.

The study protocol complied with the ethical principles of the Declaration of Helsinki and was approved by the local ethics committee. At the end of the initial screening interview, details of the study protocol were discussed with each participant, after which participants gave their written, signed informed consent.

Patients completed the dream diary over a one-week period at home. The CTQ was filled out at the beginning of the study. The completion of the FKL, ASN, and ADS-K followed 1 day after end of the dream recordings.

Dream reports were typed out, randomized and blindly rated by an external judge according to the scales described in the section "dream content analysis". In order to compute inter-rater reliability, dream reports were rated by a second judge. Word counts of the dream reports were determined as a measure for dream length. To obtain a cumulative index of negative themes per dream (for statistical analyses), for each dream a sum score was generated by adding the number of negative themes that were present in the dream (i.e., aggression directed towards the dreamer, aggression directed by the dreamer at others, negative self-description, threat, and stress). If a participant reported more than one dream, means were computed in order to obtain individual dream scores. Similarly, the positive and negative emotional intensities of the dreams as rated by the participants were calculated by averaging the ratings across the number of dreams reported.

Data were analyzed with the Statistical Package for Social Sciences Version 15.0 (SPSS Inc., Chicago, IL, USA). First, descriptive statistics were generated for the participants' demographic and psychometric characteristics. Second,

hypothesized associations between the dream variables and childhood maltreatment experiences, current stressors, and depressivity were tested using correlation analyses. Finally, blockwise multiple regression analyses were conducted to evaluate the amount of variance in the dream data that can be explained by current conditions (i.e., current stressors and depressivity) and childhood maltreatment history respectively. Variables were entered into the model in the following order: block 1 included variables representing current level of stress and current depressive symptoms, and block 2 included variables representing early-life maltreatment. α -level was set at .05 for all analyses.

3. Results

3.1. Sample characteristics

Global characteristics of our sample are described in Table 1. The sample included 37 persons and comprised 34 employed workers, 2 unemployed participants, and 1 student. According to the guidelines by Bernstein and Fink (1998) for classifying scores on the CTQ subscales respecting severity of childhood abuse and neglect, 20 participants (54%) reported having experienced at least one form of childhood maltreatment of at least moderate severity. Furthermore, most of the childhood maltreatment experiences rated as "moderate" or "severe" pertained to the domains emotional and physical neglect.

3.1.1 Age-related trends

To evaluate age trends in the psychological measures and dream data, Pearson correlations between these measures and the participants' age were calculated. Age was significantly correlated with CTQ total score ($r = .421, p \leq .01$) and the CTQ subscales emotional neglect ($r = .409, p \leq .01$) and physical neglect ($r = .466, p \leq .01$). Therefore, age was covaried in the respective analyses. No significant correlations were found between age and the dream data, the occurrence of critical life events in the last six months, the current level of stress, and current depressive symptoms.

3.1.2 Sex differences

Since Student's t-tests with sex as the independent variable revealed no significant differences between men and women in both the dream data and questionnaire measures, their data were combined for all analyses.

3.2. Dream recall and dream content analysis

On average, participants reported 3.2 ± 2.7 dreams during the 7 nights of collection with a range from 1 to 11 dreams per participant. Mean length of the dream reports was 45.5 ± 34.8 words (range: 6 to 148 words). Neither dream recall frequency nor dream length was correlated with the variables representing childhood maltreatment experiences (i.e., CTQ total score and CTQ subscales), current level of stress (i.e., FKL and ASN total score), and current depressive symptoms (i.e., ADS-K total score).

Table 1 includes prevalence information for the dream content scales in our sample. As can be seen in Table 1, sadness was not present in the dream reports of the present sample. Therefore, this scale was not taken into account for further analyses.

Table 1. Sample characteristics: demographics, early-life maltreatment experiences, current level of stress, depressive symptoms, and dream data.

N = 37	<i>M</i> ± <i>SD</i>	Range	%
Educational level (number of school years)	9.8 ± 1.5	8-13	
Self-reported duration of insomnia (years)	12.4 ± 8.9	1-33	
Early-life maltreatment experiences (CTQ)			
Emotional abuse	7.1 ± 2.0	5-12	
Physical abuse	6.1 ± 2.3	5-16	
Sexual abuse	5.9 ± 2.7	5-19	
Emotional neglect	14.1 ± 5.0	5-22	
Physical neglect	7.4 ± 1.9	5-11	
Current level of stress			
Critical life events, last 6 months (FKL)	0.2 ± 0.2	0-1	
Current level of stress, last week (ASN)	1.5 ± 0.3	1-3	
Current depressive symptoms (ADS-K)	10.2 ± 5.7	2-24	
Self-rated intensity of dream emotions			
Intensity of positive emotions	1.2 ± 0.9	0-3	
Intensity of negative emotions	1.5 ± 1.0	0-4	
Dream content analysis data			
Anger			3.4 %
Apprehension			6.0 %
Happiness			2.6 %
Sadness			0.0 %
At least one negative theme in dream			37.9 %
Aggression towards the dreamer			9.5 %
Aggression by the dreamer			4.3 %
Negatives (dream ego)			25.0 %
Threat			6.5 %
Stress			21.6 %

Note. CTQ = childhood trauma questionnaire; FKL = questionnaire assessing critical life events; ASN = general level of stress; ADS-K = general depression scale (short version).

For all scales, interrater reliability (exact agreement) ranged between 93% and 98%, except for negatives concerning the dream ego (86%) and occurrence of stress in the dream (81%).

3.3. Correlations between early-life maltreatment experiences, current level of stress, depressive symptoms, and dream data

To assess the relations between childhood maltreatment experiences and the dream variables, partial correlations between CTQ scores, self-rated intensity of dream emotions, and dream content scales were computed with age covaried (Table 2). Since the hypothesis of the present study aims at childhood maltreatment experiences in general without making any assumption about what kind of negative childhood experience affects dreams in adulthood, only the analyses with CTQ sum (i.e., CTQ total score) are hypothesis testing whereas the correlations with the five CTQ subscales are purely exploratory. As can be seen in Table 2, significant

positive correlations were obtained between the total score on CTQ and both anger and number of negative themes in dream. Marginally significant negative correlations were found between the CTQ total score and the self-rated intensity of positive emotions and – contrary to expectations – the occurrence of apprehension in dream. The correlations of the CTQ subscales were largely comparable with the exception of the subscale “sexual abuse” where no significant relationships with the dream data were found.

In order to explore to what extent current level of stress and depressivity are associated with the dream variables as well, correlation coefficients between these variables and the FKL (indicating the occurrence of critical life events in the last six months), the ASN (indicating the stress level of the last week), and the ADS-K total score (indicating depressive symptomatology of the last week) were calculated. As depicted in Table 3, the analyses revealed that the current level of stress was significantly related to the occurrence of negative themes in dreams. Marginal significant

Table 2. Correlations between early-life maltreatment experiences, self-rated intensity of dream emotions, and dream content analysis data.

N = 37	CTQ sum	Emot. abuse	Phys. abuse	Sex. abuse	Emot. negl.	Phys. negl.
Intensity of positive emotions	-.26 (+)	-.02	-.36 *	.20	-.37 **	-.21
Intensity of negative emotions	.19	.23 (+)	.20	-.14	.17	.27 *
Anger	.43 **	.18	.39 **	.14	.37 **	.40 **
Apprehension	-.27 (+)	-.02	-.18	-.12	-.27 (+)	-.27 (+)
Happiness	-.06	-.14	-.13	-.10	.09	-.09
Negative dream themes ^a	.44 **	.23 (+)	.66 ***	.01	.31 *	.35 *

Note. Partial correlations, controlling for age; CTQ = childhood trauma questionnaire; ^a number of negative themes per dream (i.e., aggression, negative self-description, threat, and stress).

(+) $p < .10$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$; tested one-tailed.

relationships were found between current stress level and self-rated intensity of positive and negative dream emotions. In addition, the occurrence of critical life events in the last six months was significantly related to apprehension within dreams, and a marginal significant correlation between depressive symptoms and the number of negative dream themes was found.

Interestingly, correlation analyses between the variables representing early-life maltreatment (i.e., CTQ scores) and the variables representing contemporary stress (i.e., FKL and ASN total scores) revealed no significant relationships. In contrast, there were significant correlations between current depressivity (i.e., ADS-K total score) and CTQ total score ($r = .328, p \leq .05$) and the CTQ subscales emotional abuse ($r = .418, p \leq .01$) and physical abuse ($r = .384, p \leq .05$). To control for a potential influence of depressivity on the associations between childhood maltreatment experiences and dream data, additional partial correlations, controlling for age and depressive symptoms, were carried out.

In doing so, CTQ total score remained strongly associated with the intensity of positive emotions ($r = -.225, p < .10$), anger ($r = .414, p \leq .01$), apprehension ($r = -.225, p < .10$), and the number of negative themes in dream ($r = .390, p \leq .01$).

Since adverse childhood experiences, current stressors, and depressive symptoms are correlated with the dream variables, we tended to explore the extent in which an early history of maltreatment experiences in consideration of current stressors and depressive symptoms can predict dream data. Therefore, for each dream variable a blockwise multiple regression analysis with two blocks was performed. In the first step of the regression analysis, variables indicating current stress and depressivity were entered in the model. Therefore, block 1 included the variables critical life events of the last six months as well as stress level and depressive symptoms of the last week. To explore if adverse childhood experiences can additionally account for the unexplained variance in the dream data, in block 2 we entered the five

Table 3. Correlations between current stress, depressive symptoms, self-rated intensity of dream emotions, and dream content analysis data.

N=37	Critical life events (last 6 months)	Current stress level (last week)	Depressive symptoms (last week)
Intensity of positive emotions	-.14	-.26 (+)	-.16
Intensity of negative emotions	.13	.26 (+)	.13
Anger	-.13	.18	.13
Apprehension	.30 *	-.01	.01
Happiness	.04	.12	-.17
Negative dream themes ^a	.19	.42 **	.22 (+)

Note. Pearson correlations; ^a number of negative themes per dream (i.e., aggression, negative self-description, threat, and stress).

(+) $p < .10$, * $p \leq .05$, ** $p \leq .01$; tested one-tailed.

Table 4. Blockwise multiple regression analyses of current stress and depressive symptoms (block 1) and early-life maltreatment experiences (block 2) on self-rated intensity of dream emotions and dream content analysis data.

N=37	Current stress and depressive symptoms ^a	Early-life maltreatment experiences ^b	Blocks 1 and 2 together	
	R ²	Δ R ²	R ²	adj. R ²
Intensity of positive emotions	.065	.292 *	.357 *	.174
Intensity of negative emotions	.071	.139	.210	-.016
Anger	.112	.114	.227	.006
Apprehension	.140 ⁽⁺⁾	.062	.202	-.026
Happiness	.114	.106	.220	-.003
Negative dream themes ^c	.178 *	.331 **	.510 **	.370

Note. ^a Block 1 included the variables stress level of the last week (ASN), critical life events of the last six months (FKL), and depressive symptomatology of the last week (ADS-K); ^b Block 2 included the five CTQ-scales emotional, physical, sexual abuse, and physical and emotional neglect; ^c number of negative themes per dream (i.e., aggression, negative self-description, threat, and stress).

⁽⁺⁾ $p < .10$, * $p \leq .05$, ** $p \leq .01$; tested one-tailed.

CTQ-scales emotional, physical, sexual abuse, and physical and emotional neglect.

Table 4 presents the results of these regression analyses with the dream data as the dependent variables. Childhood maltreatment experiences predicted a significant amount of variance in the intensity of self-rated positive dream emotions (29.2%) and the occurrence of negative themes in dream (33.1%).

4. Discussion

The aim of the present study was to explore to what extent early-life maltreatment experiences in the form of neglect or abuse are linked to negative dream emotions and negatively toned dream themes in later adulthood. As correlation analyses indicate, childhood abuse and neglect experiences are related to more anger and negatively toned dream themes. Even in consideration of current stressors and depression which also seem to affect dream content, childhood maltreatment experiences proved to be important predictors of less positive dream emotions and more negative themes in dream such as aggression, negative self-description, threat, and stress.

The present findings are consistent with results from other studies indicating that traumatic experiences can be followed even many years later by an increased number of dreams including negatively toned themes and emotions (Cernovsky, 1987; Chambers & Belicki, 1998; Lavie & Kaminer, 1991; Rosen et al., 1991). Lavie and Kaminer (1991) found in a sample of Holocaust survivors 45 years after liberation more dreams including anxiety and existential threat compared to normal control volunteers. In a study involving 38 Czechoslovak refugees, the frequency and intensity of trauma-related dreams decreased over the course of time but such dreams were still detectable 10 years after escape (Cernovsky, 1987). Using a longitudinal design, Terr (1981, 1983) investigated the change of trauma-related dream content over time in a sample of traumatized schoolchildren having been involved in a school-bus kidnapping. The author found that the initial response to the traumatic event was dominated by terror dreams and nightmares including exact replications of the kidnapping events (Terr, 1981). At a 4-year follow-up (Terr, 1983), the dream contents

contained more modifications of the actual traumatic scene or involved symbolic narratives incorporating feelings of horror and fear in more disguised forms, exact replications were no more found. Based on extensive clinical analyses, Hartmann (1998) also revealed changes in dreams after trauma. At first, traumatized persons dreamed about the actual event as it happened. Then, gradually, dreams changed and appeared to deal with the dominant emotion by portraying the traumatic experiences through associations, symbols and metaphors (e.g., dreams of being overwhelmed by a tidal wave or being swept up by a whirlwind).

The results of our study lead to the question which mechanisms can explain a possible relationship between early-life maltreatment experiences and dreaming in adults. Two alternative – or complementary – explanations are conceivable. The continuity hypothesis states that there is a continuum between waking time and dreaming, i.e. dreams reflect waking life experiences, concerns, and thoughts (Domhoff, 1996; Schredl, 1999; Strauch & Meier, 1996). As a matter of fact, there is support from numerous studies which clearly demonstrate that waking life experiences are incorporated into dreams (e.g., Hartmann, 2000; Schredl, 2000, 2003; Schredl & Erlacher, 2008; Schredl & Hofmann, 2003; Schredl & Montasser, 1999). As early abuse and neglect affect the inner life of individuals in long-lasting and profound ways, evidenced by more overall psychiatric and somatic symptomatology, depressive moods, anxiety, aggression, suicidal tendencies, and lower self-esteem in adult life (e.g., Briere et al., 2008; Chapman et al., 2004; Finzi-Dottan & Karu, 2006; Rich et al., 1997; Schilling et al., 2008; Spertus et al., 2003; Van der Vegt et al., 2008; Weber et al., 2008), changes in the dream content of persons with early-life maltreatment experiences could mirror the waking-time emotional and cognitive experiences and processes of the persons concerned.

Another view for explaining correlations between traumatic experiences and dreaming could be the so-called mastery theory of dream function which postulates that dreams serve an adaptive function in the emotional processing of experiences (e.g., Breger, 1969; Cartwright, 1996; Koulack, 1993; Kramer, 1993). Since this approach is difficult to verify, empirical evidence is scarce. Support for this hypothesis

is provided by the findings of Cartwright (1996) who studied the dreams of women going through divorce. She found that incorporation of the ex-spouse in the dream was helping the investigated women to cope with divorce. In another study by Cartwright (Cartwright & Lloyd, 1994), increased REM activity associated with dreaming following a stressful life event was associated with better adaptation.

In an extension of the mastery hypothesis to the field of trauma, it has been proposed that the altered night-time state of consciousness allows the dreamer to process and integrate the painful and stressful events (e.g., Hartmann, 1998; Newell & Cartwright, 2000). Kramer (1991) distinguishes two possible dream patterns of processing stressful experiences: (a) a progressive-sequential pattern in which unresolved daytime problems are reactivated, processed and eventually resolved, and (b) a repetitive-traumatic pattern in which stressful events are recurrently reactivated during dreaming without any notable progress towards the solution of the problem. According to this theory, changing dream contents from dreams with replicative or specific features of the traumatic events to dreams with only thematic associations to the trauma as well as a decrease in intense feeling of anxiety are seen as an indication of successful trauma management (Hartmann et al., 2001). Thus, correlations between childhood trauma and negatively toned dreams may reflect an ongoing emotional-cognitive process of attempted mastery within the dreams. Unfortunately, on the basis of the findings of the present study this hypothesis cannot be answered conclusively.

Finally, several methodological limitations must be taken into consideration when interpreting the results of this study. First, the generalizability of the data is restricted because only a relative small sample of insomnia patients was included. To prove whether the results of the present study may be generalized to other populations and in particular to healthy controls, further research with different and larger samples is needed. Second, as with other retrospective surveys, the assessment of childhood maltreatment may have been subject to recall bias. It is a well-documented phenomenon that biographical memories become distorted over time and that reports of life experiences may be influenced by retrospective memory biases such as infant amnesia, a general tendency to seek meaning in memories, psychopathology, and mood state at the time of retrospective reporting (see for review Hardt & Rutter, 2004). Since, for instance, depressive symptoms were significantly correlated with childhood maltreatment measures in the present study, the possibility must be taken into account that current depressive mood state might have affected childhood estimates in the sense that depressive mood may have fostered the recall of painful memories. On the other hand, even after controlling for depressivity, early-life stressors remained strongly associated with dream variables. Furthermore, Hardt and Rutter (2004) concluded in their review that adults' retrospective reports of major adverse experiences in childhood seem to be valid in the sense that when abuse and neglect is retrospectively reported to have taken place, these positive reports are likely to be correct. The main concern over validity rather stems from the finding that retrospective reports seem to involve a substantial rate of false negatives, i.e. that they are likely to provide underestimates of the incidence of abuse and neglect. As a third concern, the occurrence of adult traumatic experiences was not assessed. Therefore it cannot be determined to what extent also severe stressful

experiences made in later life are confounded with our findings. Furthermore, apart from the assessment of the current level of stress and depressive symptoms, there was no elaborated measurement of waking life parameters. It would have been of interest to examine whether childhood maltreatment history also is connected with specific emotions, self-perception, and experiences of threat and aggression in waking life and in what way this relation affects dreaming again. A last limitation concerns the statistical methodology. Given the large number of predictor variables, the rather small sample size should be viewed with caution. Anyway, according to Backhaus et al. (2006) who recommended at least twice as many participants as predictor variables, we comply with the minimum criteria.

To summarize, the present study data suggest that there is an association between a history of early-life maltreatment and a tendency towards negatively toned dream patterns in later adulthood. Based on the present results, it is not possible to draw any inferences about the causality of the detected correlations. Therefore, more prospective longitudinal studies are needed to explore how and why dreams change over time as a consequence of traumatic experiences.

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