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Night-time experiences and daytime dissociation: A path analysis modeling study

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ABSTRACT

Dissociative symptoms may be the by-products of a labile sleep–wake cycle (Koffel and Watson, 2009a). This may help to explain why dissociation overlaps with fantasy proneness and cognitive failures. Using path analysis, we tested to what extent data gathered in a nonclinical, predominantly female sample ($N=139$) supported two conceptual models. The first model assumes that unusual sleep experiences increase fantasy proneness and cognitive failures, which in turn encourage trait dissociation and reports of trauma. The second model assumes that trauma leads to dissociative experiences both directly and through its influence on sleep. In this cross-sectional design, the data were reasonably well described by both models. Importantly, in both models, unusual sleep experiences serve as antecedents of trait dissociation. Our analysis underlines the importance of unusual sleep experiences and may inspire treatment intervention focusing on sleep normalization.

1. Introduction

The *Diagnostic and Statistic Manual of Mental Disorders* defines dissociation as "a disruption in the usually integrated function of consciousness, memory, identity, or perception of the environment" (DSM-IV-TR; American Psychological Association, 2000, p. 519). Dissociation is often viewed as a continuum ranging from benign to pathological experiences, with depersonalization and dissociative identity disorder situated at the pathological end (Giesbrecht and Merckelbach, 2008; Holtgraves and Stockdale, 1997; Irwin, 2001). Over the past decades, numerous studies have assessed the prevalence of dissociative symptomatology in various populations. General population surveys found that dissociative disorders may affect 3.3–11.2% of the population (Loewenstein, 1994; Murphy, 1994; Waller and Ross, 1997). Moreover, dissociative symptoms are common in certain clinical groups, such as mood disorders, post-traumatic stress disorder (PTSD), and persons with schizotypal traits (Brand and Loewenstein, 2010; Galbraith and Neubauer, 2000; Giesbrecht and Merckelbach, 2008). Research has also documented a link between sleep paralysis and dissociative symptoms in people who report childhood trauma experiences (McNally and Clancy, 2005). This finding dovetails with the work of Watson (2001) and Koffel and Watson (2009a) who presented evidence to the effect that daytime dissociation is associated with problematic sleep–wake state boundaries, which may be precipitated by trauma.

It is well established that good sleep conveys cognitive benefits, while sleep problems may undermine cognitive efficiency (Walker and Stickgold, 2006). Sleep problems are usually defined as having trouble falling asleep, experiencing awakenings during the night, waking up too early, or not feeling rested after a night's sleep. However, sleep problems may also entail unusual sleep experiences such as having nightmares or vivid dreams, recurring dreams, sleep paralysis, and hypnagogic or hypnopompic hallucinations (Soffer-Dudek and Shahar, 2009; Soffer-Dudek et al., 2011). Sleep problems are common in the general population. For instance, it is estimated that a third of the Dutch population now and then experiences sleep problems, with 15% suffering from insomnia (Fonds Psychische Gezondheid, 2009). Most importantly, disruptions in sleep patterns figure prominently in mood and anxiety disorders, schizophrenia, and borderline personality disorder (Benca et al., 1992; Morin and Ware, 1996). For example, 70–91% of the patients diagnosed with PTSD suffer from sleep problems such as falling asleep or staying asleep, and up to 71% of them report nightmares (Maher et al., 2006).

In a pioneering study on dissociation and sleep in two large student samples, Watson (2001) observed that unusual sleep experiences (e.g., vivid dreams, hypnagogic hallucinations) are related to dissociative symptoms. Since then, a number of studies have replicated this observation (Giesbrecht and Merckelbach, 2004; Watson, 2003; Van der Kloet et al. 2011; see for a review:

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Van der Kloet et al., 2012). There is also anecdotal evidence that suggests an intimate relationship between dissociation and cataplexy (LaVia and Brewerton, 1996), a hallmark feature of narcolepsy, and people suffering from Depersonalization Disorder often state that their symptoms are most pronounced when they feel tired (Simeon and Abugel, 2006). Furthermore, researchers have found a substantial overlap between dissociative experiences and nightmare frequency (Agargun et al., 2003; Levin and Fireman, 2002; Soffer-Dudek and Shahar, 2011), as well as dreaming states (Barrett, 1994). Moreover, one sleep deprivation study in healthy people reported that sleep loss intensifies dissociative symptoms (Giesbrecht et al., 2007).

Taken together, these studies suggest that dissociative symptoms may be the by-products of a labile sleep–wake cycle (Koffel and Watson, 2009a; Van der Kloet et al., 2012). This view assumes thin boundaries between the sleeping and waking states (e.g., Hartmann, 1991). These thin boundaries would allow for the intrusion of dreamlike content into the waking state, which would set the stage for dissociative symptoms. This conceptualization of dissociation sometimes referred to as *cross-state continuity*. It is based on the assumption that "some structures and processes implicated in nightmare production are also engaged during the expression of pathological signs and symptoms during the waking state" (Levin and Nielsen, 2007, p. 483). The link between sleep and dissociation appears to be rather specific in that dissociation is related to unusual sleep phenomena that are difficult to control. Thus, nightmares and waking dreams are related to dissociative symptoms and schizotypy, while insomnia and lassitude seem to be related to mood and anxiety (Koffel and Watson, 2009b).

The relation between sleep and dissociation is even more apparent when exploring the sleep-related dissociative disorders. This group of dissociative episodes arises at night, and they are viewed by some researchers as re-enactments of previous trauma and may sometimes involve violence or injury. However, unlike the parasomnias, these unwanted behaviors arise from wakefulness and occur near sleep–wake transitions (Warren, 2013). Again, this observation dovetails with the concept of cross-state continuity.

The sleep-dissociation link may help to explain why dissociation overlaps with fantasy proneness and cognitive failures. Fantasy proneness is usually defined as a disposition to engage in vivid and extensive fantasizing. Several studies in clinical (Boom et al., 2010; Kunst et al., 2011) and non-clinical samples (Merckelbach et al., 2000a; Giesbrecht and Merckelbach, 2006; Rauschenberg and Lynn, 1995) found a positive correlation between dissociative symptoms, as measured by the Dissociative Experiences Scale (DES; Bernstein and Putnam, 1986) or the Peri-traumatic Dissociative Experiences Questionnaire (PDEQ; Marmar et al., 1997), and fantasy proneness, as measured by the Creative Experiences Questionnaire (CEQ; Merckelbach et al., 2001). Cognitive failures refer to everyday slips and lapses (Broadbent et al., 1982) and are frequently reported by highly dissociative individuals (Giesbrecht et al., 2004; Levin et al., 2004; Merckelbach et al., 2002, 1999) and dissociative patients alike (Dorahy et al., 2006; Simeon et al., 2009).

As to the interrelationships between these three trait variables, the following remarks are in order. First, conceptually, fantasy proneness can be considered a close cousin of absorption, one of the subscales of the DES (Rauschenberg and Lynn, 1995). Second, empirical research has found time and again that cognitive failures and fantasy proneness are correlates of dissociative tendencies (Giesbrecht and Merckelbach, 2006; Merckelbach et al., 2005). Thus, they tap into a common domain. For example, Watson stated that "measures of dissociation, schizotypy, and sleep-related experiences define a common domain that is characterized by intense and unusual cognitive/perceptual phenomena" (Watson, 2001, p. 527). Third, and taking this one step further, one could speculate that chronic sleep disturbances have two distinct consequences: dreamlike mentation during waking states and cognitive dysfunction, both constituting – or at least overlapping with – two prominent dimensions of the DES: absorption and amnesia (Van der Kloet et al., 2012). Yet, this is a tentative model, and in the absence of empirical evidence, the relationships could as well be reversed (i.e., habitual dissociation promoting absorption and cognitive failures).

There is some debate as to whether or not childhood trauma is a necessary causal antecedent of dissociative symptomatology (Lynn et al., 2012; Giesbrecht et al., 2008; Bremner, 2010; Dalenberg et al., 2012). That fantasy proneness and cognitive failures correlate with dissociation is an important fact to consider for theories on the origins of dissociative symptoms. Specifically, some authors have argued that the combination of fantasy proneness and cognitive failures may lead to biased reports of traumatic childhood events. First, fantasizers may confuse imagined events with factual autobiographical memories. Second, this tendency may lower respondents' criteria for reporting ambiguous events as traumatic in nature, thus exhibiting a positive response bias, or in more extreme cases, a tendency to confabulate (Giesbrecht et al., 2008; Merckelbach and Jelicic, 2004). Of course, such an interpretation is far removed from the view that dissociation is a defensive response to childhood trauma (Spiegel et al., 2011; Dalenberg et al., 2012).

Germane to this debate is a study by Merckelbach et al. 2002 who contrasted a model in which (self-reports of) trauma causally precede dissociation and a concurrent model in which heightened levels of fantasy proneness and cognitive failures constitute dissociation and together precede self-reports of trauma. Their structural equation modeling results performed on data gathered in an undergraduate sample led the authors to conclude that the data provided a similar degree of support to both models (Merckelbach et al., 2002).

The structural equation modeling (SEM) approach of Merckelbach et al. (2002) did not take sleep disturbances as a potential antecedent of dissociation into account. With this in mind, the present study built on these previous findings and investigated whether data gathered in an undergraduate sample would support a model in which sleep disturbances precede dissociative symptoms. Using path analyses we compared two models. Specifically, we tested whether the data are best described by trauma being associated with dissociative experiences both directly and through its influence on sleep (model 1), or by unusual sleep experiences fueling fantasy proneness and cognitive failures, which in turn constitute trait dissociation and contribute to reports of trauma (model 2).

2. Method

2.1. Participants and procedure

Participants were 139 undergraduate students (122 women) with a mean age of 21.4 years (*range*: 17–32 years). They received written and oral information about the study, after which they gave written informed consent. Participants completed a baseline screening, containing self-report questionnaires, via the user-friendly software program EMIUM (Janssen, 2008). They kept a diary for 3 weeks, 3 days per week, twice a day. This diary involved self-report measures on dreams and night-time experiences, but also measures of state dissociation, sleepiness, and mood during the day. After completion of all questionnaires, participants were rewarded with course credits or a small monetary reward. For the purpose of the present paper, we restrict our analyses to data from the baseline screening (i.e., DES, ISES, CFQ, CEQ, CTQ-SF). The study was approved by the standing ethical committee of the Faculty of Psychology and Neuroscience, Maastricht University, The Netherlands.

Model 1 (the Trauma-Dissociation model) was based on the original model 1 from Merckelbach et al. 2002. To this model, we added the ISES as variable between CTQ and DES. Then, we discussed the different concepts and theories within a team of experts and came up with a number of possible, contrasting models. The final model 2, as presented in this paper, resulted as the most theoretically interesting and contrasting to model 1. Model 2 (the Sleep-Dissociation model) has an alteration regarding the placement of CTQ, which is in line with Merckelbach et al. (2002). Moreover, we have contrasted the placement

of both CEQ and CFQ with regard to the DES. Thus, we have not only changed the direction of the arrows in model 2, but also the placement of the variables.

2.2. Measures

Dissociative Experiences Scale (DES; Cronbach's α=0.93; Bernstein and Putnam, 1986). The DES is a self-report scale that requires participants to indicate on 100 mm visual analog scales (anchors: 0=*never*; 100=*always*) to what extent they experience 28 dissociative experiences in daily life. Examples of such experiences include feelings of depersonalization and derealization, and memory difficulties (i.e., psychogenic amnesia). Van IJzendoorn and Schuengel (1996) provide meta-analytic evidence for the sound psychometric properties of the DES. We calculated the DES total score (divided by 28).

Iowa Sleep Experiences Survey (ISES; Cronbach's α=0.78). The ISES (Watson, 2001) consists of 18 questions asking the respondent to rate the frequency of various sleep- and dream-related experiences on a 7-point Likert scale (anchors: 1=*never*, 7=*several times a week*). The ISES consists of 2 separate subscales, which measure general sleep experiences (e.g., "I have recurring dreams.") and lucid dreaming (e.g., "I am aware that I am dreaming, even as I dream"), respectively. Whereas the General Sleep experiences subscale taps into symptoms of narcolepsy, vivid and unusual dreams, and other nocturnal experiences, the Lucid Dreaming subscale consists of several items about knowing that you are dreaming while still being asleep (Watson, 2001). In the present study, we restricted our analyses to the General Sleep experiences subscale of the ISES. This subscale has consistently been shown to be related to dissociative symptoms, whereas prior studies found the relationship between dissociation and the Lucid Dreaming subscales to be modest at best. To obtain a total General Sleep subscale score, we summed up the ISES items 1 through 15.

Cognitive Failures Questionnaire (CFQ; Cronbach's α=0.78). The CFQ (Broadbent, et al., 1982) is a 25-item self-report instrument tapping everyday lapses in perception and attention (e.g., "So you fail to notice signposts on the road?"), memory (e.g., "Do you forget appointments?"), and actions (e.g., "Do you bump into people?"). The CFQ has sound psychometric properties. Participants are requested to indicate on 5-point scales how often they experienced each cognitive failure during the past month (anchors: 0=*never*; 4=*very often*). Scores are summed to obtain a total CFQ score, with higher scores indicating a higher frequency of self-reported failures. Merckelbach et al. (1996) reported that the Dutch version of the CFQ has adequate psychometrical properties.

Creative Experiences Questionnaire (CEQ; Cronbach's α=0.72; Merckelbach et al., 2001). The CEQ is a Dutch instrument to measure fantasy proneness. It consists of 25 yes/no items measuring daydreaming, intense fantasies, and imagination. The items of the CEQ were derived from extensive case vignettes on fantasy proneness provided by Wilson and Barber (1983). Illustrative items are "I spent more than half of the day on fantasizing or daydreaming" and "Many of my fantasies are as vivid as a good movie". A total CEQ score is obtained by summing the number of items that are endorsed.

Childhood Trauma Questionnaire – Short Form (CTQ-SF; Cronbach's α=0.91; Bernstein et al., 2003). The CTQ is a widely used self-report scale designed to assess five types of childhood maltreatment: (1) physical abuse, (2) emotional abuse, (3) sexual abuse, (4) physical neglect, and (5) emotional neglect. In the present study, we employed the Dutch short form, which consists of 28 items. These are scored on 5-point scales anchored 1 (never) and 5 (very often). The Dutch CTQ-SF possesses adequate internal consistency and test-retest reliability and it effectively discriminates between clinical and non-clinical samples (Thombs et al., 2009). Items are summed to obtain a CTQ-SF total score.

2.3. Data analysis

Statistical analyses were performed using SPSS 18.0 and LISREL software. Cronbach's α values were used to estimate internal consistency of the baseline measures. Mean scores and Pearson product-moment correlations between baseline measures were calculated.

Together with standard deviations, correlations served as the input for path analysis modeling which was carried out with LISREL (Student Edition version 8.80). Using structural equations for these path analyses, we are able to test how well the empirically derived correlational patterns support the models that we sketched above (Schumacker and Lomax, 1996). Basically, this technique makes it possible to determine whether and to what extent an a priori formulated causal model is consistent with the observed data. Given the relatively small sample size (N=139), we decided to obtain several fit indices for the two models. Thus, the following fit indices are reported (also see Schumacker and Lomax, 1996): (1) the χ^2 Goodness-of-Fit value that has to be non-significant for the tested model to be considered a good fit with the observed data; (2) the root mean square error of approximation (RMSEA) that is relatively insensitive to sample size and indicates the fit of the model in relation to degrees of freedom. RMSEA values below 0.05 imply a close fit of the model (Browne and Cudeck, 1993), and (3) the Tucker–Lewis non-normed fit index (NNFI) that according to some authors (e.g., Lawrence et al., 1995) provides a particularly good estimate of how well a model fits when data are based on small sample sizes. NNFI values that exceed the 0.9 level are indicative of well-fitting models.

3. Results

Scores on the ISES, CEQ, and CFQ were normally distributed, but DES and CTQ were skewed to the right (DES: *Skewness*=0.91, SE=0.21, *kurtosis*=0.27, SE=0.41; CTQ: *Skewness*=1.90, SE=0.21, *kurtosis*=3.57, SE=0.41, respectively). For the purpose of the path analyses, we decided to perform data transformation on the scores of the latter two scales. After a shift transformation to set the minimum DES score equal to 1, a square root transformation was applied to the DES scores. For CTQ, we used logarithm transformation. First, we subtracted 24, so as to set the minimum equal to 1. This transformation resulted in symmetrically distributed DES and CTQ scores (DES: *Skewness*=0.15, SE=0.21, *kurtosis*=−0.52, SE=0.41; CTQ: *Skewness*=−0.20, SE=0.21, *kurtosis*=−0.78, SE=0.41, respectively). Transformed scores were highly correlated with the original scores (i.e., r's=0.85–0.98). Table 1 gives mean scores and Pearson product-moment correlations between baseline measures. Both original and transformed scores are shown. With one exception, correlations involving original and transformed measures never differed more than 0.05. The exception concerns the correlation between CTQ and CEQ, which fell from 0.32 to 0.21 after data transformation. Mean scores on dissociation (DES), cognitive failures (CFQ), and fantasy proneness (CEQ), and self-reports of trauma (CTQ) were comparable to results obtained in previous non-clinical studies (Giesbrecht and Merckelbach, 2004; 2006).

3.1. Path analysis modeling

Table 2 shows fit indices for the two models specified in Figs. 1 and 2. Model 1 (the Trauma-Dissociation model) assumes that childhood trauma (CTQ) is the antecedent. This model seems to describe the data well and after removal of the non-significant path from unusual sleep experiences (ISES) to cognitive failures (CFQ), the model fit becomes excellent, see Table 2 and Fig. 1.

Table 1
Mean scores and Pearson product-moment correlations of baseline measures (N=139), transformed scores in *italics*.

	Mean (S.D.)	1	2	3	4	5
1. *ISES*	45.41 (10.00)	–	–	–	–	–
2. *CTQ CTQlon*	33.47 (9.72) *1.75 (1.07)*	0.26* (*0.21**)	–	–	–	–
3. *CFQ*	64.81 (9.05)	0.23*	0.22**(*0.23***)	–	–	–
4. *CEQ*	6.22 (3.49)	0.36*	0.32*(*0.21**)	0.20*	–	–
5. *DES sqrtDES*	18.49 (12.96) *20.97 (8.21)*	0.39**(*0.41***)	0.35**(*0.30***)	0.41**(*0.43***)	0.37**(*0.36***)	–

Note: ISES=Iowa Sleep Experiences Survey; CTQ=Childhood Trauma Questionnaire (Log transformation); CFQ=Cognitive Failures Questionnaire; CEQ=Creative Experiences Questionnaire; DES=Dissociative Experiences Scale (Square Root transformation).

* $p<0.05$
** $p<0.01$

Table 2
Fit indices of the Trauma-Dissociation model (model 1) and the Dissociation-Trauma model (model 2), see also Figs. 1 and 2.

	χ^2	*P*	RMSEA	NNFI
Model 1 (d.f.=4)	3.64	0.46	0.00	0.99
Model 2 (d.f.=4)	6.26	0.18	0.07	0.95

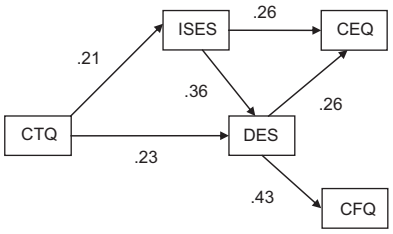

Fig. 1. The Trauma-Dissociation model (model 1). Reported are the standardized pad-coëfficients. *Note*: CTQ=Childhood Trauma Questionnaire (Log transformation); ISES=Iowa Sleep Experiences Survey; DES=Dissociative Experiences Scale (Square Root transformation); CEQ=Creative Experiences Questionnaire; CFQ=Cognitive Failures Questionnaire.

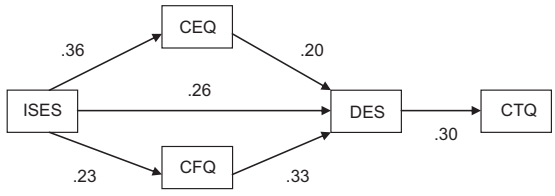

Fig. 2. The Dissociation-Trauma model (model 2). Reported are the standardized pad-coëfficients. *Note*: ISES=Iowa Sleep Experiences Survey; CFQ=Cognitive Failures Questionnaire; CEQ=Creative Experiences Questionnaire; DES=Dissociative Experiences Scale (Square Root transformation); CTQ=Childhood Trauma Questionnaire (Log transformation).

Next, we explored model 2 (the Dissociation-Trauma model), which had a problematic fit ($\chi^2=29.96$, $p<0.001$; RMSEA=0.13, and NNFI=0.77). However, there were only 2 variables larger than 2 in the standardized residuals. More specifically, the correlations between trait dissociation (DES) and unusual sleep experiences (ISES) were poorly reproduced. The overview of modification indices suggested adding a direct effect from unusual sleep experiences (ISES) to dissociation (DES). We incorporated this amendment in a second step. The revised model 2 had a good model fit, see Table 2 and Fig. 2.

To sum up, model 1 gave an acceptable fit of the data without any modifications. Model 2 started out with a poor fit of the data, but modification of the model ultimately led to a reasonable model fit. Thus, both models are consistent with the data. Longitudinal research is warranted to determine which of the two models is closest to the empirical data. Interestingly, in both examined models, unusual sleep experiences (ISES) serve as a determinant of trait dissociation (DES). Importantly, swapping the placement of DES and ISES, led to a substantially poorer fit of both models.

4. Discussion

This study explored different conceptual causal models to explore the relations between dissociation, unusual sleep experiences, self-reports of childhood traumatic experiences, and other related constructs. Our findings can be cataloged as follows.

Replicating previous research (e.g., Giesbrecht and Merckelbach, 2006) we found dissociation to be related to fantasy proneness, and cognitive failures. Also, as was found in many previous studies (for a review, see Dalenberg et al., 2012), dissociation was significantly and positively related to self-reports of childhood traumatic experiences. This is in line with researchers who assume that trauma causes dissociation within clinical and nonclinical groups (Allen et al., 2002). Nevertheless, the link between dissociation and trauma might, at least to some extent, be inflated due to absentmindedness implied by cognitive failures and/or exaggeration implied by fantasy proneness (Merckelbach et al., 2000b, 2002). Notably, individuals who are more prone to cognitive failures often mistrust their own cognitive capacities, leading them to rely more strongly on information from others, which makes them more vulnerable to suggestive information (Merckelbach and Jelicic, 2004).

Second, we also replicated the finding that dissociative symptoms are related to unusual sleep experiences (e.g., Koffel and Watson, 2009a, Giesbrecht et al., 2006, Van der Kloet et al., 2012). Thus, not only trauma reports, fantasy proneness, and cognitive failures can be considered solid correlates of dissociation, the same is true for unusual sleep phenomena such as nightmares, sleep paralysis, or hypnagogic hallucinations. Clearly, unusual sleep experiences deserve a place in conceptual models that try to explain the origins of dissociative symptoms.

Third, using path analysis modeling, we analyzed the goodness of fit for two theoretically motivated models, based on the previous study by Merckelbach et al. (2002). Our analyses did not unambiguously favor any of the two. Thus, while the significant correlations between dissociation, fantasy proneness, cognitive failures, and trauma self-reports are well replicated, it remains impossible to determine the precise causal flow between these variables, as our cross-sectional design does not allow for causal inferences. Taken together with the findings from Merckelbach et al. (2002), one may however be tempted to speculate that both models represent two different potential pathways to dissociation. This would explain why there are two seemingly contradictory lines of research in dissociation research with some scientists advocating a clear role of trauma in dissociation (e.g., Dalenberg et al., 2012), and others emphasizing the substantial heritability of dissociative experiences (Jang et al., 1998).

Fourth, both models clearly imply that unusual sleep experiences are closely related to dissociation. Thus, it seems that unusual sleep experiences can contribute to more sophisticated models about the origins of dissociation. Previous studies leave no doubt that such experiences are highly prevalent in people with dissociative disorders (Van der Kloet et al., 2012) and in trauma survivors (Maher et al., 2006). Interestingly, among participants who report memories of childhood sexual abuse, experiences of sleep paralysis[1] typically are accompanied by raised levels of dissociative symptoms (McNally and Clancy, 2005; Abrams et al., 2008). While our path analysis modeling findings are inconclusive concerning the role of trauma in dissociation, both models clearly suggest that unusual sleep phenomena are strongly associated with higher levels of dissociation.

A focus on sleep disturbances might inspire new treatment methods aimed at sleep hygiene interventions for people suffering from dissociative disorders. Germane to this idea, a review of Lamarche and De Koninck (2007) showed that treatments for sleeping difficulties in people with posttraumatic stress disorder (PTSD) significantly improved sleep, but also lead to a significant decrease in other PTSD symptoms, including dissociation. Interventions along these lines might be also be promising for other

[1] Sleep paralysis occurs when the normal paralysis during REM sleep is experienced when falling asleep or awakening, often accompanied by hallucinations of danger or a malevolent presence in the room.

forms of psychopathology that are accompanied by high levels of dissociation (e.g., eating disorders, schizophrenia). Thus, future research in this area may inspire the development of new treatment methods based on sleep normalization.

Some restrictions of the current study merit attention. Limitations include the cross-sectional design of this study and its relatively small sample size. Also, although we employed well-validated measures, our study heavily relied on self-reports in a nonclinical sample. With such a sample, relatively low rates of childhood trauma are expected. The predominantly female gender and young mean age in our sample pose a limitation as well, for dream recall is highest in subjects around their twenties and in women compared to men (Schredl and Reinhard, 2008). Furthermore, with the measures we employed, it is difficult to differentiate specifically between dissociation, unusual sleep experiences, and sleep-related dissociative episodes. Admittedly, our reliance on distinct measures of dissociation, fantasy proneness, and cognitive failures invite causal speculations about the interrelationships between these measures. Meanwhile, it might well be the case that these three measures are, in fact, difficult to separate from one another and define a common conceptual space. This implies a certain restriction of range, which may have influenced the explanatory power of the models that we evaluated. Thus, large scale studies in which factor analytic approaches are used would be necessary to address this issue in a more thorough fashion. It may well be the case that in a sample with longitudinally obtained data of verified childhood trauma (e.g., Noll et al., 2003), the predictory range of childhood trauma is entirely different from the one found in the current study (for reviews see Dalenberg et al., 2012; but see Cima et al., 2001; Sanders and Giolas, 1991). Also, it should be acknowledged that the choice and interpretations of goodness-of-fit data has been the subject of intense debate (Schumacker and Lomax, 1996). Thus, further research is warranted to move forward towards to the empirical truth.

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