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Chronic Sleep Disturbances and Borderline Personality Disorder Symptoms

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Objective: Few studies have examined the experience of chronic sleep disturbances in those with borderline personality disorder (BPD), and further establishing this association may be pertinent to enhancing current treatments, given the relevance of sleep to emotion regulation and stress management. ***Method:*** Data were analyzed (N = 5,692) from Part II of the National Comorbidity Survey–Replication (NCS-R) sample (Kessler & Merikangas, 2004), which assessed personality disorders and sleep problems. Rates of chronic sleep disturbances (difficulty initiating sleep, difficulty maintaining sleep, and waking earlier than desired), as well as the consequences of poor sleep, were examined. Indices for BPD diagnosis and symptoms were used in logistic and linear regression analyses to predict sleep and associated problems after accounting for chronic health problems, Axis I comorbidity, suicidal ideation over the last year, and key sociodemographic variables. ***Results:*** BPD was significantly associated with all 3 chronic sleep problems assessed, as well as with the consequences of poor sleep. The magnitude of the association between BPD and sleep problems was comparable to that for Axis I disorders traditionally associated with sleep problems. BPD symptoms interacted with chronic sleep problems to predict elevated social/emotional, cognitive, and self-care impairment. ***Conclusions:*** Sleep disturbances are consistently associated with BPD symptoms, as are the daytime consequences of poor sleep. There may also be a synergistic effect where BPD symptoms are aggravated by poor sleep and lead to higher levels of functional impairment. Sleep in patients with BPD should be routinely assessed, and ameliorating chronic sleep problems may enhance treatment by improving emotion regulation and implementation of therapeutic skills.

Keywords: borderline personality disorder, insomnia, fatigue, sleep, emotion dysregulation

Although not traditionally thought of as a disorder associated with sleep disturbances, there is growing evidence that those with borderline personality disorder (BPD) experience a variety of problems with sleep, including increased sleep onset latency and low sleep efficiency during polysomnography assessments (Bastien, Guimond, St-Jean, & Lemelin, 2008), abnormal sleep architecture (Battaglia, Strambi, Bertella, Bajo, & Bellodi, 1999), and nightmares (Asaad, Okasha, & Okasha, 2002; Selby, Ribeiro, & Joiner, in press). Sleep problems are clinically pertinent to BPD, as they are linked to functional impairment (Roth et al., 2006) and emotion dysregulation (Zohar, Tzischinsky, Epstein, & Lavie, 2005). To date, minimal research has systematically examined sleep disturbances in BPD, particularly chronic sleep problems. Chronic sleep problems involve difficulty sleeping most nights for an extended period of time (often lasting weeks to months), as opposed to acute sleep problems, which may last for a few days or arise intermittently, and can lead to major problems in daily functioning (Simon & Von Korff, 1997). Research is also lacking on BPD and the daytime consequences of chronic sleep problems, such as excessive daytime sleepiness, poor sleep-related fatigue, and difficulties engaging in activities due to poor sleep. Importantly, BPD may increase vulnerability to sleep problems, due to issues such as emotion dysregulation, and poor sleep may result in elevated daytime functional impairment.

Improving our understanding of sleep disturbances in BPD is also relevant to improving our interventions. At present, dialectical behavior therapy (DBT; Linehan, 1993) is the only psychotherapy for BPD that specifically addresses sleep problems. Improving the sleep of patients with BPD may aid in improving their ability to manage stressful situations, employ coping skills, and improve overall levels of energy and positive affect. In turn, improving the ability to manage stress may further reduce sleep problems (Carl-

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son & Garland, 2005). Those with BPD also frequently experience suicidal ideation, the experience of which has itself also been linked to sleep problems (Sjöström, Wærn, & Hetta, 2007; Wojnar et al., 2009). This makes it important to determine if the sleep problems of those with BPD also occur beyond the context of suicidal ideation.

Previous studies on sleep and BPD have involved small samples, often during acute polysomnography studies, and none to date have examined BPD and chronic sleep problems in a large epidemiological sample. One advantage to using such a sample is reduced treatment-seeking bias and increased understanding of how these issues affect people in the community at-large. Another advantage is the ability to control for Axis I disorders that are intertwined with acute and chronic sleep problems (e.g., depression, anxiety disorders)—an important issue given the role of comorbidity in BPD (Lenzenweger, Lane, Loranger, & Kessler, 2007). The purpose of the present study was to examine chronic sleep disturbances, poor sleep-related consequences, and social/emotional and cognitive impairment as a function of poor sleep in those exhibiting BPD symptoms with the National Comorbidity Survey–Replication (NCS-R; Kessler & Merikangas, 2004).

Method

Sample and Diagnostic Assessment

The NCS-R was a nationally representative, institutional review board–approved survey of adults age 18 and older designed to involve multistage clustered area probability sampling and conducted between 2001 and 2003. Overall, the survey consisted of 9,282 respondents, with an overall response rate of 70.9%. All respondents in the NCS-R completed the Part I diagnostic interview, which consisted of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI 3.0; Kessler & Üstün, 2004) and included diagnostic information on anxiety disorders, mood disorders, and substance use disorders. Blinded clinical reappraisals of a probability subsample of the NCS-R indicated good concordant validity between the Axis I diagnosis (Kessler et al., 2005) according to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV;* American Psychiatric Association, 1994) and the CIDI diagnosis. In addition to completing assessment the CIDI, a probability subsample of respondents ($N = 5{,}692$), with and without *DSM–IV* diagnoses, also received the NCS-R Part II interview, which also assessed personality disorders and sleep problems; only NCS-R Part II data were used in this study.

BPD Symptoms

Respondents completed eight questions taken from the International Personality Disorder Examination (IPDE) screening questionnaire (Loranger et al., 1994) designed to measure BPD symptoms. These items have been used extensively in examining personality disorders (e.g., Lenzenweger, 1999; Lenzenweger et al., 2007) and have been found to significantly predict personality disorder diagnoses when the IPDE was clinician-administered (Loranger, 1999; Loranger et al., 1994). Furthermore, the more IPDE items were endorsed, the higher was the probability that a personality disorder diagnosis was obtained using structured clinical interviews (Lenzenweger, Loranger, Korfine, & Neff, 1997). Items were rated with a dichotomous yes (1) or no (0) answer, and all were summed to create a continuous measure of BPD ($\alpha = .74$). Importantly, clinical reappraisal interviews were previously conducted by phone on a probability subsample of 214 respondents from Part II of the NCS-R and screened positive for personality disorder symptoms, and clinical reassessments with the IPDE were highly correlated ($r > .90$) with these items (Lenzenweger et al., 2007).[1] Of note, because the NCS-R included a separate suicidal behavior assessment, the IPDE BPD question on suicidal and self-injurious behavior was not included. As a result of this missing criterion, three indices of BPD were generated for use in this study: (1) a dichotomous measure for those endorsing 5+ diagnostic criteria for BPD (to obtain odds ratios), (2) a continuous measure of BPD symptoms, and (3) a dichotomous BPD diagnosis (5+ symptoms endorsed) including occurrence of a lifetime suicide attempt (from the suicide assessment below).

Regarding the distribution of BPD symptoms, Selby (2013) found that the base rates (BRs) of BPD symptoms in this sample, as well as the endorsement of those symptoms by those with BPD (diagnostic sensitivity; DS), were well represented: intense anger (BR = 23%, DS = 73%), affective instability (BR = 30%, DS = 90%), chronic emptiness (BR = 21%, DS = 83%), identity disturbance (BR = 19%, DS = 73%), stress-related paranoia (BR = 17%, DS = 69%), avoiding abandonment (BR = 12%, DS = 60%), impulsivity (BR = 40%, DS = 89%), and unstable relationships (BR = 15%, DS = 60%). Thus, those with BPD in this sample exhibited the full spectrum of BPD symptoms.

Chronic Sleep Problems

Three common sleep problems assessed during Part II of the NCS-R were used (1) delayed sleep onset latency (SOL; "nearly every night it took you two hours or longer before you could fall asleep"), (2) amount of time spent awake after sleep onset (WASO; "you woke up nearly every night and took an hour or more to get back to sleep"), and (3) waking earlier in the morning than desired (EMA; "you woke up nearly every morning at least two hours earlier than you wanted to"). Each was prefaced as happening for "periods lasting two weeks or longer in the past 12 months." All were consistent with *DSM–IV* definitions for the associated sleep problem and have been reported on previously (Roth et al., 2006).

Poor Sleep Consequences

In addition to chronic sleep problems, this study examined the consequences of poor sleep using three assessments: (1) problems "feeling sleepy during the day," (2) feeling fatigued during the day due to "poor sleep," and (3) frequency of being "too tired to complete daily activities" as a result of poor sleep. All questions were assessed in the same section as the above questions about

[1] Diagnostic efficiency analyses of the IPDE BPD screening items have indicated adequate sensitivity (all >.60), specificity (all >.66), negative predictive power (all >.95), and total predictive value (all >.68); however, all were somewhat low on positive predictive power (range .24–.53), indicating that endorsing only one symptom was not a strong indicator for the presence of a BPD diagnosis and supporting the notion that multiple items needed to be endorsed for a diagnosis (Selby, 2013).

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chronic sleep problems. The first question, on the experience of daytime sleepiness most days for two or more weeks in the past 12 months, was coded as yes (1) or no (0). The second question, relating to daytime fatigue as a result of poor sleep, and the third question, regarding frequency of being too tired to carry out daily activities—both of which were asked in terms of the frequency of the problem during the worst month in the past year—were rated on 4-point Likert scales. These two questions were originally rated 1 (*never*), 2 (*rarely*), 3 (*sometimes*), and 4 (*often*). In order to simplify the presentation of results and present odds ratios, these items were recoded to reflect that 4 (often experience of this problem) was recoded as (1), and all other ratings were coded as (0).

AQ: 5

Functional Impairment

Six outcomes were utilized from the World Health Organization Disability Assessment Schedule II (WHO-DAS II; Chwastiak & Von Korff, 2003), a 36-item measure for general disability impairment. Respondents reported the severity of each problem over the last 30 days regarding the following: (1) days having been totally unable to work or carry out daily activities (days out of role), (2) days able to carry out normal activities but with reduced workload or inhibited productivity (reduced work quality), (3) difficulty caring for oneself with activities such as hygiene (self-care), (4) difficulties with physical mobility, (5) cognitive impairment (e.g., difficulty remember things), and (6) difficulty with social and emotional role performance (e.g., controlling emotions when around other people). The complex method (Chwastiak & Von Korff, 2003), which involves item response theory, was used to score each scale, and this resulted in a continuous scale range from 0 (*no disability*) to 100 (*full disability*).[2]

AQ:6, Fn2

Comorbid *DSM–IV* Disorders

All respondents were rated for Axis I diagnoses with the CIDI, which has good concordance with other structured clinical interviews (Kessler et al., 2004; Kessler et al., 2005). The following disorders, which were present over the last 12 months, were included as covariates in all analyses: major depressive disorder (MDD), dysthymia, manic episode, alcohol and drug dependence, panic disorder (with and without agoraphobia), generalized anxiety disorder (GAD), and posttraumatic stress disorder (PTSD). Each of these disorders has sleep problems as a symptom or has been linked to sleep problems, and their inclusion allowed for benchmarks to compare the association between BPD and sleep problems to. To examine comorbidity, variables were generated to indicate presence (1) or absence (0) of any two or three Axis I disorders.

AQ: 7

Suicidality

As a part of the CIDI, all respondents completed a suicide risk assessment that included lifetime history of suicidal behavior as well as suicidal behavior in the last 12 months. Those who had "seriously thought about committing suicide" were coded and used as a covariate in analyses, and the presence of a lifetime suicide attempt was also used to generate one of the BPD indices described above.

Sociodemographic Control Variables

The following variables from the NCS-R were included in all analyses due to their potential impact on sleep problems: age, sex, race–ethnicity, education level, marital status, occupational status, family income level, and number of preschool children living at home. The relationships between covariates and personality disorders and sleep problems has previous been reported on (Lenzenweger et al., 2007; Roth et al., 2006). Also included was the presence or absence of any one of the following chronic health conditions endorsed, due to potential sleep interference: arthritis, neck or back ache, headaches, chronic pain, chronic allergies, stroke, and heart disease.

Data Analytic Strategy

Logistic regression analyses were used to examine sleep problems and consequences, with the coefficients and their standard errors exponentiated as odds ratios with 95% confidence intervals. All analyses included medical and sociodemographic control variables, comorbid Axis I disorders, and presence of suicidal ideation in the last year; adjusted odds ratios (AORs) were presented. Finally, the interactions between BPD symptoms and chronic sleep problems in predicting functional impairment were examined with linear regression. Because the NCS-R was a complex sample involving clustering, stratification, and weighting specific to Part II, in order to adjust for potential differences in probability of selection for the sample, data analysis had to account for these procedures. Accordingly, standard errors of the logistic regression and linear regression analyses were adjusted for these sampling and weighting procedures with the COMPLEX function of the MPlus statistical program (Muthén & Muthén, 2008–2010).

AQ: 8

Results

Prevalence of Sleep Problems and Borderline Personality Disorder

A total of 63% of those meeting diagnostic criteria for BPD (5+ symptoms endorsed) reported having at least one of the sleep problems assessed. The average duration for sleep problems for those with BPD was 19.9 weeks ($SD = 21.6$), which was significantly more than for those without BPD ($M = 8.9$, $SD = 17.2$), $F(1, 6590) = 45.4$, $p < .01$, $d = 0.60$. As seen in Table 1, those with BPD reported significant experiences with delayed SOL (AOR = 1.8, *wald* = 33.3, $p < .01$), WASO (AOR = 1.9, *wald* = 41.3, $p < .01$), and EMA (AOR = 2.3, *wald* = 64.8, $p < .01$). BPD diagnosis was also a significant predictor of having all three chronic sleep problems (27% of those with BPD; *wald* = 37.75, $p < .01$, AOR = 2.1). BPD associations with each of the chronic sleep problems were similar in magnitude to those of disorders

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[2] The main effects of BPD diagnosis on the six indices of impairment measured by the WHO-DAS II have previously been reported on, with significant effects found for BPD diagnosis on mobility, cognition, days out of role, diminished role quality, and problems with social and emotional functioning (Lenzenweger et al., 2007). However, the current study builds on these findings by examining the interaction between a continuous predictor of BPD symptoms and the number of chronic sleep problems assessed, and in this study the WHO-DAS II scales were left as continuous variables rather than dichotomized as in the previous study.

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Table 1
Multivariate Logistic Regression Analyses Predicting Sleep Problems (N = *5,692*)

DSM–IV diagnosis	Sleep onset latency > 120 min		Wake after sleep onset > 60 min		Early morning awakening > 120 min	
	% Yes	AOR [95% CI]	% Yes	AOR [95% CI]	% Yes	AOR [95% CI]
Chronic health problem present	24	2.2** [1.8, 2.6]	30	2.3** [1.9, 2.7]	24	1.9** [1.6, 2.3]
Major depressive disorder	39	1.6** [1.3, 2.1]	47	2.1** [1.6, 2.6]	34	1.4* [1.1, 1.7]
Dysthymia	55	1.6* [1.1, 2.4]	60	1.4 [1.0, 2.1]	50	1.6* [1.1, 2.3]
Mania	51	1.8** [1.3, 2.6]	51	1.9** [1.3, 2.7]	47	1.7** [1.2, 2.5]
Alcohol dependence	48	2.0* [1.2, 3.6]	48	2.8** [1.6, 5.0]	37	1.8 [1.0, 3.3]
Any drug dependence	42	0.5 [0.2, 1.3]	39	0.6 [0.2, 1.4]	37	0.7 [0.3, 1.8]
Generalized anxiety disorder	45	1.6** [1.2, 2.1]	51	1.7** [1.3, 2.2]	42	1.5** [1.2, 2.0]
Panic disorder	45	1.2 [.9, 1.7]	52	1.6** [1.1, 2.2]	44	1.4* [1.0, 2.0]
Posttraumatic stress disorder	48	1.9** [1.4, 2.5]	57	2.5** [1.9, 3.3]	44	1.8** [1.3, 2.4]
Severe suicidal ideation	48	1.4* [1.0, 2.0]	50	1.3 [0.9, 1.9]	42	1.3 [0.9, 1.8]
Any 2 Axis I disorders	44	1.2 [.9, 1.7]	48	1.0 [0.8, 1.4]	40	1.2 [0.9, 1.6]
Any 3+ Axis I disorders	53	0.8 [0.5, 1.1]	57	0.7 [0.5, 1.0]	45	0.6* [0.4, 1.6]
5+ BPD symptoms	44	1.7** [1.4, 2.1]	47	1.9** [1.6, 2.3]	43	2.2** [1.8, 2.7]
BPD symptoms continuous	—	1.2** [1.1, 1.2]	—	1.2** [1.1, 1.2]	—	1.2** [1.2, 1.3]
5 + BPD symptoms including lifetime suicide attempt	44	1.8** [1.5, 2.3]	47	1.9* [1.6, 2.3]	43	2.1** [1.7, 2.6]

Note. Percentages refer to those within that group endorsing the identified problem; all sleep problems were reported as occurring for 2 weeks or longer over the previous 12 months. All analyses include sociodemographic control variables. All variables through the first BPD assessment were simultaneously entered into one model and presented; the second two BPD indices were then included in the model in place of the first BPD index. *DSM–IV* = *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994); AOR = adjusted odds ratio; CI = confidence interval; BPD = borderline personality disorder.
* $p < .05$. ** $p < .01$.

traditionally linked to sleep problems or involving sleep problems in diagnostic criteria (e.g., GAD, MDD, PTSD).

Borderline Personality Disorder and Poor Sleep-Related Consequences

Approximately 66% of those with BPD reported having at least one consequence over the last 12 months. BPD diagnosis (see Table 2) demonstrated clear and consistent associations, beyond covariates, with sleepiness during the day (AOR = 2.0, *wald* = 51.2, $p < .01$), daytime fatigue due to poor sleep (AOR = 2.1, *wald* = 43.4, $p < .01$), and being too tired to complete daily activities (AOR = 1.9, *wald* = 12.8, $p < .01$). BPD diagnosis was also a significant predictor of having all three poor sleep consequences (6% of those with BPD; *wald* = 7.5, $p < .01$, AOR = 2.1). As with chronic sleep problems, BPD diagnosis had AORs

Table 2
Multivariate Logistic Regression Analyses Predicting Poor Sleep Consequences (N = *5,692*)

DSM–IV diagnosis	Daytime sleepiness		Daytime fatigue		Too tired to complete activities	
	% Yes	AOR [95% CI]	% Yes	AOR [95% CI]	% Yes	AOR [95% CI]
Chronic health problem present	46	2.5** [2.2, 2.9]	18	2.7** [2.1, 3.4]	5	2.0** [1.3, 3.2]
Major depressive disorder	66	2.3** [1.8, 2.8]	29	1.7** [1.3, 2.2]	9	1.3 [0.8, 2.1]
Dysthymia	66	0.9 [0.6, 1.4]	36	1.2 [0.8, 1.8]	18	1.8* [1.1, 3.1]
Mania	57	1.3 [0.9, 1.8]	31	1.4 [1.0, 2.1]	9	.9 [0.5, 1.8]
Alcohol dependence	61	1.6 [0.9, 2.7]	33	2.5** [1.4, 4.7]	7	1.5 [0.5, 4.7]
Any drug dependence	64	1.0 [0.4, 2.5]	28	.7 [0.3, 2.0]	3	.8 [0.1, 9.7]
Generalized anxiety disorder	65	1.7** [1.3, 2.3]	34	1.8** [1.4, 2.4]	11	1.1 [0.7, 1.7]
Panic disorder	68	1.9** [1.4, 2.5]	31	1.1 [0.8, 1.6]	14	1.3 [0.7, 1.7]
Posttraumatic stress disorder	68	2.0** [1.5, 2.6]	35	1.7** [1.3, 2.3]	16	2.4** [1.6, 3.6]
Severe suicidal ideation	64	1.1 [0.8, 1.6]	34	1.4 [1.0, 2.0]	16	2.1** [1.3, 3.4]
Any 2 Axis I disorders	64	1.0 [0.7, 1.3]	30	1.0 [0.7, 1.4]	10	1.0 [0.6, 1.6]
Any 3+ Axis I disorders	68	0.7* [0.5, 0.9]	35	.7 [0.5, 1.1]	15	1.2 [0.6, 2.4]
5+ BPD symptoms	65	2.0** [1.7, 2.4]	32	2.0** [1.6, 2.5]	10	1.9** [1.3, 2.7]
BPD symptoms continuous	—	1.2** [1.2, 1.3]	—	1.3** [1.2, 1.4]	—	1.2* [1.1, 1.3]
5 + BPD symptoms including lifetime suicide attempt	64	2.0** [1.7, 2.4]	31	2.2** [1.4, 3.3]	10	2.1* [1.0, 4.3]

Note. Percentages refer to those within that group endorsing the identified problem. All analyses include sociodemographic control variables. All variables through the first BPD assessment were simultaneously entered into one model and presented; the second two BPD indices were then included in the model in place of the first BPD index. *DSM–IV* = *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994); AOR = adjusted odds ratio; CI = confidence interval; BPD = borderline personality disorder.
* $p < .05$. ** $p < .01$.

similar in magnitude to those of many Axis I disorders traditionally associated with sleep problems.

Functional Impairment Associated With Poor Sleep and Borderline Personality Symptoms

T3 BPD interacted with sleep problems (see Table 3) to indicate more problems with self-care ($\beta = .08$, $t = 3.0$, $p < .01$), cognitive impairment ($\beta = .17$, $t = 7.1$, $p < .001$), and social/emotional impairment ($\beta = .19$, $t = 7.9$, $p < .001$) after accounting for key F1 covariates. Figure 1 indicates worse impairments for those with more BPD symptoms who exhibited more sleep problems for these areas of functioning. No significant interactions were found for days out of role, role impairment, or decreased physical mobility.

Discussion

The current study found a clear and consistent report of chronic sleep disturbances in those with BPD, even after accounting for key covariates, with many experiencing delayed SOL, increased WASO, and increased EMA most days for at least 2 weeks over the last year. Interestingly, the magnitudes of the AORs for BPD on chronic sleep problems was similar to those for other Axis I disorders often associated with sleep disturbance and with sleep-related criteria (i.e., MDD, GAD). BPD was also significantly associated, due to problems sleeping, with increased daytime sleepiness, fatigue, and feeling too tired to complete daytime activities. Potential reasons for the association between BPD and sleep problems, beyond Axis I contributions, may be that BPD psychopathology increases vulnerability to sleep problems because of emotion dysregulation or rumination (Selby & Joiner, 2009) or because of interpersonal conflicts during the day. Such experiences during the day may translate into difficulty falling asleep or frequent awakenings due to preoccupation with the problems or increased arousal. They may also experience frequent nightmares on days with more emotion dysregulation (Selby et al., in press).

Findings also indicated that when those with BPD have sleep problems they might experience increased difficulties with emotion dysregulation, problems in social relationships or self-care,

Table 3
BPD and Chronic Sleep Problems Predicting Functional Impairment

Outcome	Set $F(1, 5611)$	r^2_{Total}	t	β
Self-care	7.6***	.04		
BPD symptoms			1.3	.05
Sleep problems			5.2***	.08
BPD × Sleep			3.0**	.08
Cognitive	42.8***	.18		
BPD symptoms			4.4***	.07
Sleep problems			8.2***	.11
BPD × Sleep			7.1***	.17
Mobility	25.0***	.12		
BPD symptoms			1.8	.03
Sleep problems			10.1***	.14
BPD × Sleep			.5	.01
Out of role	41.4***	.18		
BPD symptoms			3.6***	.05
Sleep problems			12.8***	.17
BPD × Sleep			1.8	.04
Role quality	21.3***	.11		
BPD symptoms			3.4**	.05
Sleep problems			7.0***	.10
BPD × Sleep			.4	.01
Social/emotional impairment	36.5***	.16		
BPD symptoms			3.7***	.06
Sleep problems			7.1***	.10
BPD × Sleep			7.9***	.19

Note. All analyses include chronic health problems, sociodemographic variables, Axis I comorbidity, and suicidal ideation in the last year as control variables. BPD = borderline personality disorder.
** $p < .01$. *** $p < .001$.

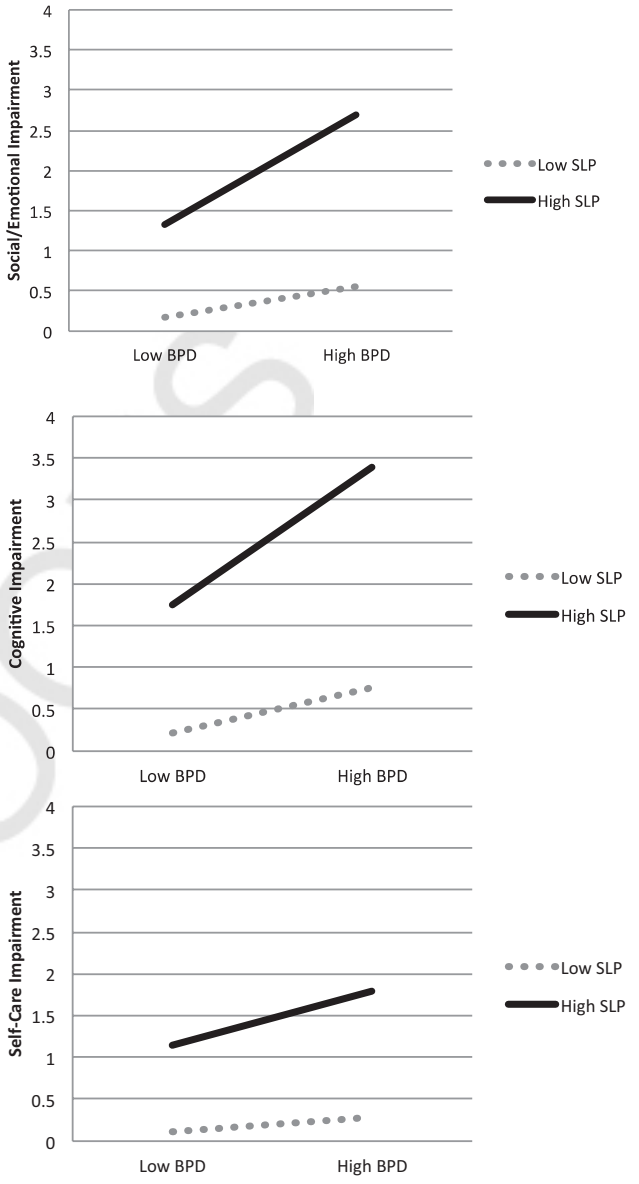

Figure 1. Interaction between BPD symptoms and chronic sleep problems on functional impairment on the World Health Organization Disability Assessment Schedule II. Low and high levels refer to one standard deviation below and above the mean, respectively. BPD = borderline personality disorder (referring to BDP symptoms); SLP = sleep (referring to the number of sleep problems).

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and memory problems. These interactions suggest that when both problems are present a positive feedback loop may arise where BPD symptoms may contribute to poor sleep and poor sleep aggravates symptoms of BPD. However, there may be differential effects of sleep problems on aggravating BPD symptoms, and some may be more affected than others. For example, despite the finding that many with BPD reported feeling too tired to complete daily activities due to poor sleep, BPD symptoms did not interact with sleep problems to predict number of days out of role or reduced role quality, nor did the interaction predict decreased physical mobility. However, those with elevated BPD symptoms and sleep problems reported more cognitive and social/emotional impairment. These findings indicated that when those with BPD are experiencing sleep problems, they may have increased problems with issues such as emotion dysregulation, social relationships, and remembering things (potentially impacting techniques and skills learned in therapy). Furthermore, a significant interaction was also found for those with BPD and sleep problems in predicting decreased ability for self-care, and reduced self-care also likely worsens problems with emotional, social, and cognitive regulation. Future research should compare those with BPD who do and do not have chronic sleep problems to determine if there are significant group differences in intensity or duration of specific BPD symptoms or if symptoms are exacerbated at a more general level.

Important strengths of the current study to consider include use of a large, nontreatment-seeking sample and controlling for medical, Axis I, and sociodemographic variables associated with sleep problems. One primary limitation involved cross-sectional assessment of sleep problems over the last year (e.g., potential recall bias), and there was some temporal inconsistency between the indices measured over the course of the last year (sleep problems) and the indices measured over the last 30 days (functional impairment). Longitudinal studies are needed to determine if BPD increases vulnerability to sleep problems or if sleep problems simply aggravate BPD symptoms. Further, all indices in this study were self-report, and further studies with sleep diary monitoring and/or polysomnography studies may be needed to replicate and extend these findings and ascertain more precise assessments of chronic sleep problems in BPD. Another limitation was that BPD was assessed with IPDE screening items, and findings should be replicated in samples where BPD is assessed with structured clinical interviews. Finally, other factors may be involved in the BPD association with poor sleep, such as being hypervigilant or worried about sleep problems, poor sleep environment, or sleep state misperceptions.

Clinically, monitoring of sleep problems and associated impairment may be important in therapy, and it may be beneficial to thoroughly cover facets of sleep hygiene as a routine part of therapy for those with BPD. Although some therapies for BPD integrate sleep hygiene to some extent (e.g., the emotion regulation module of DBT; Linehan, 1993), many therapies may overlook this issue. It may be the case that treating sleep will help reduce negative emotion in those with BPD, and such daytime improvements may further improve overall sleep quality. Finally, sleep hygiene alone may not be enough to treat some BPD patients with chronic sleep problems, and some patients may also benefit from additional cognitive behavior therapy for insomnia (Edinger & Means, 2005).

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AUTHOR QUERIES

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