



Anxiety sensitivity and sleep disturbance: Investigating associations among patients with co-occurring anxiety and substance use disorders[☆]



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ABSTRACT

Sleep disturbance is a common problem among individuals with anxiety and substance use disorders (SUD). Anxiety sensitivity (AS) is elevated in patients with anxiety disorders and SUD and has been linked to sleep-related problems, including insomnia and somnolence (i.e., daytime sleepiness). We examined the unique roles of AS cognitive, physical, and social concerns in sleep disturbance among a sample of 99 residential SUD patients with anxiety disorders. Clinical levels of insomnia or somnolence were evidenced by 53.5% of the sample. Consistent with predictions, AS physical concerns was significantly associated with insomnia, and AS cognitive concerns was significantly related to insomnia and somnolence. Hierarchical linear regression models were conducted to test the association of AS cognitive and physical concerns with insomnia and somnolence symptoms while controlling for relevant factors. AS cognitive concerns accounted for unique variance, above and beyond withdrawal symptoms, anxiety, and depressive symptoms, in the model examining insomnia symptoms ($B = 0.30$, $SE = 0.13$, $p = 0.023$). Results suggest that AS cognitive concerns may represent an important transdiagnostic mechanism underlying sleep disturbance among individuals with dual diagnosis.

1. Introduction

Both anxiety and substance use disorders (SUD) are highly prevalent in the general population, with 12-month prevalence rates of 11.1–18.1% and 3.8–9.4%, respectively (Grant et al., 2004; Kessler, Chiu, Demler, Merikangas, & Walters, 2005). Moreover, these disorders have been found to co-occur frequently in community and clinical samples (Conway, Compton, Stinson, & Grant, 2006; Grant et al., 2004; Lai, Cleary, Sitharthan, & Hunt, 2015). In particular, rates of anxiety disorders among individuals with SUD have been found to range from 17.7–29.9% in epidemiological studies (Conway et al., 2006; Grant et al., 2004) and from 26.4–38.8% in SUD treatment samples (Franken & Hendriks, 2001; McGovern, Xie, Segal, Siembab, & Drake, 2006). The co-occurrence of anxiety disorders and SUD has been found to be associated with numerous adverse outcomes, including increased symptom severity (McEvoy & Shand, 2008), greater treatment challenges (Wolitzky-Taylor, Operskalski, Ries, Craske, & Roy-Byrne, 2011), and early relapse to substance use (Schellekens, de Jong, Buitelaar, & Verkes, 2015). However, little research has examined sleep disturbance among individuals with co-occurring anxiety disorders and SUD.

Sleep disturbance, defined here as self-reported poor sleep quality,

somnolence (i.e., daytime sleepiness), and insomnia symptoms, has been consistently linked to both anxiety disorders and SUD separately (Ara, Jacobs, Bhat, & McCall, 2016; Cox & Olatunji, 2016). Approximately 11.8–58.4% of individuals with SUD and 32.5–45.6% of those with anxiety disorders experience sleep disturbance (Brower, 2015; Roth et al., 2006; Soehner & Harvey, 2012). Though rates of sleep disturbance among individuals with co-occurring anxiety disorders and SUD are difficult to estimate, co-occurring psychiatric disorders in general have been found to be positively associated with sleep disturbance. Specifically, the risk of sleep disturbance increases by 2.2–3.2 times for individuals with two psychiatric disorders and 4.6–6.3 times for individuals with three or more psychiatric disorders (compared to individuals with no psychiatric disorders; Roth et al., 2006). Notably, studies have found that sleep disturbance has a negative impact on mental and physical health (LeBlanc et al., 2007), has significant economic costs (Leger & Bayon, 2010), is associated with higher rates of disability and lower quality of life (Foley, Sarsour, Kalsekar, & Walsh, 2010; Magnee, de Weert-van Oene, Wijdeveld, Coenen, & de Jong, 2015; Ramsawh, Stein, Belik, Jacobi, & Sareen, 2009), and increases risk for suicidality, even after controlling for psychiatric symptoms (Pigeon, Bishop, & Titus, 2016; Wojnar et al., 2009). Furthermore,

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concomitant sleep disturbance is associated with worse treatment outcomes and increased relapse in both anxiety disorder (Belleville, Cousineau, Levrier, & St-Pierre-Delorme, 2011; Zalta et al., 2013; Zayfert & DeViva, 2004) and SUD (Brower, 2015; Brower, Aldrich, Robinson, Zucker, & Greden, 2001; Brower & Perron, 2010; Garcia & Salloum, 2015) samples.

Research and theoretical models suggest a complex, reciprocal relationship between sleep disturbance and both anxiety disorders (Alvaro, Roberts, & Harris, 2013; Glidewell, McPherson Botts, & Orr, 2015) and SUD (Ara et al., 2016), respectively. For example, prospective studies have demonstrated that SUD and anxiety disorders each predict sleep disturbance and vice-versa (Batterham, Glozier, & Christensen, 2012; Breslau, Roth, Rosenthal, & Andreski, 1996; Ford & Kamerow, 1989; Jansson-Frojmark & Lindblom, 2008; Pieters et al., 2015). Likewise, although sleep disturbance is a well-known consequence of intoxication, chronic substance use, and withdrawal symptoms across substances (Garcia & Salloum, 2015), individuals with SUD may also use substances to mitigate sleep disturbance. For example, one study found that patients with alcohol dependence and insomnia frequently use alcohol to induce sleep (Brower et al., 2001), whereas chronic substance users have been theorized to abuse stimulants to reverse somnolence (Roehrs & Roth, 2015). Similarly, researchers postulate that sleep disturbance occurs as both a cause and consequence of anxiety disorders (Cox & Olatunji, 2016), with some literature emphasizing the role of common, underlying processes in this relationship, such as physiological arousal and dysfunctional thoughts (Cox, Ebesutani, & Olatunji, 2015; Harvey, 2002).

Taken together, it is evident that anxiety disorders, SUD, and sleep disturbance commonly co-occur and contribute to a more severe clinical profile. Yet, remarkably few studies have investigated factors that may account for sleep disturbance among adults with co-occurring anxiety disorders and SUD. One factor that warrants examination is anxiety sensitivity (AS). Defined as a trait-like fear of anxiety-related feelings and sensations, AS is posited to amplify one's reactions to physiological arousal due to the perceived dangerousness of the cues (Reiss & McNally, 1985). To illustrate, an individual with high AS may misinterpret the experience of her or his mind racing or going blank as a sign that s/he is losing it or going crazy, resulting in increased anxiety and further exacerbation of the individual's physiological arousal. The construct of AS comprises three separate dimensions, including physical concerns (e.g., heart racing is a sign of an impending heart attack), cognitive concerns (e.g., mind going blank is a sign of mental incapacitation or 'craziness'), and social concerns (e.g., observable symptoms, such as blushing, will result in social rejection; Taylor et al., 2007).

Extant research strongly supports AS as a transdiagnostic factor that contributes to anxiety and other emotional disorders (Boswell et al., 2013; Naragon-Gainey, 2010), substance use (Norton, 2001; Stewart & Kushner, 2001), and physical health conditions (Asmundson, Wright, & Hadjistavropoulos, 2000). In addition, a growing body of research links AS to sleep disturbance. Specifically, studies have found that high AS and its dimensions are related to sleep disturbance, short sleep duration, poor sleep quality, sleep dysfunction, prolonged sleep onset latency, and sleep-related impairment, even after accounting for relevant psychological factors (e.g., depression; Alcantara, Cosenzo, Fan, Doyle, & Shaffer, 2017; Babson, Boden, Woodward, Alvarez, & Bonn-Miller, 2013; Babson, Trainor, Bunaciu, & Feldner, 2008; Calkins, Hearon, Capozzoli, & Otto, 2013; Hoge et al., 2011; Raines et al., 2015; Weiner, Meredith Elkins, Pincus, & Comer, 2015). Moreover, preliminary evidence indicates that the physical and cognitive concerns dimensions of AS may be particularly relevant to sleep. In one study, AS physical concerns moderated the relation between sleep anticipatory physical symptoms and sleep onset latency, such that the association was significant at high, but not low, AS (Babson et al., 2008). Other studies have shown that cognitive concerns is the only AS dimension associated with sleep disturbance and sleep-related impairment (when controlling

for psychological variables; Calkins et al., 2013; Vincent & Walker, 2001). For example, Raines et al. (2015) found that obsessive-compulsive disorder symptoms were indirectly associated with insomnia symptoms through AS cognitive concerns, but not physical or social concerns. Notably, the findings from these studies are consistent with Harvey's cognitive model of insomnia (2002). According to this model, individuals with high AS may be more aware of and likely to detect sleep-related symptoms, such as fatigue, heavy legs, and concentration problems (i.e., physical and mental symptoms), during daytime activities and at bedtime. Consequently, these cues are catastrophized as signs that they are not getting enough sleep, falling asleep quickly enough, or functioning well enough during the day, all of which have the effect of increasing arousal and alertness, ultimately contributing to further distress and sleep disturbance.

2. Present study

Cumulatively, prior research has demonstrated that AS is relevant to co-occurring anxiety disorders and SUD (Norton, 2001; Stewart & Kushner, 2001), and that AS cognitive and physical concerns are particularly associated with sleep disturbance (Babson et al., 2008; Raines et al., 2015). However, the association between AS dimensions and sleep disturbance among individuals with co-occurring anxiety disorders and SUD has not been examined. Accordingly, the aim of the current study was to examine associations between AS dimensions and insomnia and somnolence severity among SUD patients with a co-occurring anxiety disorder diagnosis. In particular, we sought to examine the unique contribution of each AS dimension to sleep disturbance after accounting for variance attributable to relevant covariates. Further, given both theoretical and empirical support for the relevance of AS cognitive and physical concerns in particular to sleep disturbance, we hypothesized that AS cognitive and physical concerns would relate to insomnia and somnolence above and beyond other factors relevant to both SUD and sleep disturbance.

3. Method

3.1. Participants

Participants were drawn from a sample of 227 patients admitted to a residential SUD treatment facility in the Southern United States. Individuals were excluded from the study if they reported current psychotic symptoms (i.e., delusions, hallucinations) or cognitive impairment as indicated by a score of < 24 on the Mini-Mental Status Exam (Folstein, Folstein, & McHugh, 1975). The current study included only those participants ($n = 133$) who met *Diagnostic and Statistical Manual of Mental Disorders* (4th Ed., Text Revision; American Psychiatric Association, 2000) criteria for at least one current anxiety disorder based on semi-structured clinical interviews (see Measures). The final sample was comprised of 99 participants (50.5% female; $M_{age} = 34.00$, $SD = 10.49$) with complete data. Participants primarily identified as White (67.7%) or Black/African American (28.3%). Detailed information on the demographic and diagnostic characteristics of the sample is presented in Table 1.

3.2. Measures

3.2.1. Anxiety sensitivity

AS dimensions were measured by the 18-item Anxiety Sensitivity Index – 3 (ASI-3; Taylor et al., 2007). The ASI-3 has demonstrated good reliability and validity (Taylor et al., 2007). Items are rated on a 5-point Likert-type scale (0 = *very little* to 4 = *very much*). The ASI-3 yields a total score and three subscale scores that correspond to concerns about potential Physical, Cognitive, or Social consequences of anxious arousal. The ASI-3 subscales demonstrated good internal consistency in this sample (Physical $\alpha = 0.86$; Cognitive $\alpha = 0.90$; Social $\alpha = 0.83$).

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