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Change in anxiety sensitivity and substance use coping motives as putative mediators of treatment efficacy among substance users

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A B S T R A C T

Objective: Anxiety sensitivity and coping motives for substance use are processes implicated in anxiety and substance use disorder (SUD) comorbidity, and are malleable treatment targets. Little is known about whether changes in anxiety sensitivity or coping motives during cognitive behavioral therapy (CBT) for anxiety disorders (with or without CBT for SUD) mediate substance use outcomes among patients with comorbid anxiety disorders and SUD. We examined whether changes in anxiety sensitivity and coping motives during treatment for comorbid SUD and anxiety disorders (either CBT for SUD only or CBT for SUD and anxiety disorders) were associated with substance use outcomes.

Methods: Repeated measurements of anxiety sensitivity and coping motives throughout treatment were examined from a randomized clinical trial comparing usual, CBT-based treatment at a substance use disorder specialty clinic (UC) to that usual care plus a brief CBT for anxiety program for patients with comorbid anxiety and substance use disorders (CALM ARC).

Results: Anxiety sensitivity decline during treatment was significantly steeper among those who received CALM ARC than those in UC. Decreases in anxiety sensitivity mediated the effect of treatment group on alcohol use following treatment such that the greater reduction in anxiety sensitivity in CALM ARC explained the superior outcomes for alcohol use in CALM ARC compared to UC. Declines in substance use coping motives were not observed in either condition, and did not differ between CALM ARC and UC. Thus, declines in coping motives did not mediate substance use after treatment.

Conclusions: These findings provide preliminary evidence suggesting alcohol use outcomes were related to decreasing anxiety sensitivity rather than decreasing coping motives. Implications and future directions are discussed.

Self-medication (Khantzian, 1985), tension-reduction (Conger, 1956), motivational (Cox & Klinger, 1988), mutual-maintenance (Stewart & Conrod, 2008), and negative reinforcement (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004) models posit that individuals use substances to alleviate anxiety, and that the negatively reinforcing effects of substances may lead to a pattern of maladaptive substance use. Therefore, targeting anxiety symptoms among those with comorbid anxiety disorders and SUD should not only improve anxiety symptoms, but decrease substance use as well. Indeed, a small body of research indicates that integrated treatments for anxiety disorders and SUD are effective in reducing substance use (Najavits, 2002; Kushner et al., 2006). We recently demonstrated that the addition of a brief cognitive behavioral therapy (CBT) program for anxiety disorders to usual care at a SUD specialty clinic was superior to usual care alone in reducing anxiety symptoms, drinking, and drug use (Wolitzky-Taylor et al., 2018).

It remains unclear *how* CBT for anxiety exerts its effects on substance use. Examining treatment mediators can increase understanding about how a treatment works in order to develop more targeted and effective approaches. Moreover, knowledge of the processes leading to change during treatment can help clinicians determine whether the targeted mechanisms are indeed changing for individual patients during treatment and can thus be used as a treatment decision-making tool to enhance outcomes.

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1. Anxiety sensitivity as a putative mediator of SUD outcomes

Anxiety sensitivity, implicated in the onset and maintenance of both anxiety disorders and SUD, is characterized by the degree to which an individual is prone to misappraise physiological anxiety symptoms as having harmful physical, social, and mental consequences (Reiss, Peterson, Gursky, & McNally, 1986). Anxiety sensitivity is elevated across many anxiety disorders (Olatunji & Wolitzky-Taylor, 2009), and is associated with SUD onset (Schmidt, Buckner, & Keough, 2007; Schmidt, Eggleston et al., 2007), substance severity and use (Buckner et al., 2011; Comeau, Stewart, & Loba, 2001; Hearon et al., 2011) and poor SUD treatment outcomes (Lejuez et al., 2008). Notably, anxiety sensitivity has been found to mediate the association between anxiety disorder symptoms and substance use (Wolitzky-Taylor et al., 2015), suggesting that the associations between anxiety and substance use may be explained by the degree to which an individual misappraises physiological sensations of arousal as having negative consequences.

Importantly, anxiety sensitivity is malleable. It mediates symptom outcomes in CBT for anxiety disorders, and is thought to be a core process targeted in CBT for anxiety (Meuret, Rosenfield, Seidel, Bhaskara, & Hofmann, 2010; Smits, Powers, Cho, & Telch, 2004; Arch, Wolitzky-Taylor, Eifert, & Craske, 2012). Relatedly, studies have demonstrated the success of brief CBT protocols to reduce anxiety sensitivity for prevention of problem drinking (Conrod, Castellanos-Ryan, & Mackie, 2011; Conrod et al., 2013; Schmidt, Buckner, et al., 2007; Watt, Stewart, Birch, & Bernier, 2006) and in the treatment of SUD (Schmidt, Raines, Allan & Zvolensky, 2016). Although anxiety sensitivity has been demonstrated as a mediator of change in anxiety symptoms during CBT for anxiety disorders, no study to our knowledge has investigated whether changes in anxiety sensitivity during CBT for anxiety disorders predict subsequent improvement in substance use in SUD treatment seekers.

2. Coping motives for substance use as a putative mediator of SUD outcomes

Coping motives for substance use (i.e., using drugs or alcohol to alleviate distress or cope with distressing situations) are implicated in the maintenance of substance use problems and SUDs (Cooper, Kuntsche, Levitt, Barber, & Wolf, 2016). Many cognitive behavioral treatments for SUD aim to provide patients with alternative coping strategies to decrease motivation to use substances as a way to cope with unpleasant emotions or stimuli (McHugh, Hearon, & Otto, 2010). Given that coping motives contribute to substance use for individuals with anxiety symptoms in particular (Buckner, Bonn-Miller, Zvolensky, & Schmidt, 2007; Cooper et al., 2016; Kuntsche, Knibbe, Gmel, & Engels, 2006; Tate, Pomerleau, & Pomerleau, 1994), CBT for anxiety may reduce substance use by providing individuals with new coping skills for managing anxiety. Taken together, decreases in anxiety (or improvements in ability to manage anxiety adaptively) via CBT for anxiety disorders may reduce coping motives, leading to decreased substance use.

Prior studies of CBT for SUD have found that improvements in coping skills play an important role in the reduction of substance use (Cooper et al., 2016; Kiluk, Nich, Babuscio, & Carroll, 2010; Litt, Kadden, Kabela-Cormier, & Petry, 2008; Magill, Kiluk, McCrady, Tonigan, & Longabaugh, 2015). Presumably, improvement in adaptive coping strategies would be associated with decreases in motivations to use substances to cope with distress. Indeed, one study (Banes, Stephens, Blevins, Walker & Roffman, 2014) found that coping motives declined following a CBT intervention for marijuana-dependent participants. Although this study did find that change in coping motives from baseline to a 9-month follow-up (based on scores that those two cross-sectional timepoints) was associated with 9-month marijuana use outcomes, no studies to our knowledge have utilized treatment process data (i.e., repeated measurements of coping motives *during* treatment) to examine whether decreases in coping motives mediate drug and alcohol treatment outcomes. Examining coping motives for substance as a treatment mediator explaining reduction in substance use outcomes may be particularly relevant to examine in a clinical population with comorbid SUD and anxiety disorders. Although coping motives for substance use are clearly associated with comorbid SUD and anxiety disorders, they are a general treatment target in typical SUD care. Therefore, changes in coping motives may mediate substance use treatment outcomes in both typical SUD treatment and in SUD treatment that include CBT for anxiety disorders. Research to understand the mediational role of coping motives in this comorbid population is lacking.

The current study aimed to understand the processes of change by which two distinct treatments (i.e., CBT-based usual SUD care, called “usual care”, or UC; and CBT-based usual SUD care + CBT for anxiety disorders, called “CALM for Addiction Recovery Centers”, or “CALM ARC”) leads to reduced substance use in patients with comorbid anxiety disorders and SUD by investigating two hypothesized mediators: 1) decreases in anxiety sensitivity and 2) decreases in coping motives for substance use. A small body of research has evaluated the addition of CBT to usual treatment for SUD for comorbid SUD and anxiety disorders relative to usual treatment alone (Kushner et al., 2006; Randall, Thomas, & Thevos, 2001), and some research has examined whether CBT for SUD improves anxiety symptom outcomes (Buckner & Carroll, 2010). However, no studies to our knowledge have examined theoretical process-based treatment mediators of each approach. This comparison allows for testing of differential mediation between CBT treatment that addresses comorbidity and usual care in this unique population, which can guide the refinement of treatments by identifying active change processes.

Our first hypothesis was that decreases in anxiety sensitivity and in coping motives for substance use would be significantly steeper in the condition that included usual SUD care (UC) plus a brief, CBT program for anxiety disorders (CALM ARC; Wolitzky-Taylor et al., 2018) than UC alone. Our second hypothesis was that changes in anxiety sensitivity and coping motives would mediate treatment outcome such that differences in substance use between UC + CALM ARC and UC would be explained by differential change in anxiety sensitivity and coping motives between the two treatments.

3. Methods

3.1. Design

Data analyzed in this investigation came from a hybrid efficacy/effectiveness randomized clinical trial (RCT) aimed at evaluating the effectiveness of usual care at a community-based, CBT-based Intensive Outpatient Program for SUD (UC) compared to UC plus Coordinated Anxiety Learning and Management for Addiction Recovery Centers (CALM ARC) among patients with comorbid SUD and anxiety disorders. CALM ARC is a brief (orientation + 6 treatment sessions), group-based, computer-assisted but therapist directed cognitive behavioral treatment for anxiety disorders adapted for individuals with anxiety disorder and SUD comorbidity and delivered by SUD counselors (see Wolitzky-Taylor et al., 2018).

During treatment in the Intensive Outpatient Program (IOP), eligible participants were randomized to either (a) UC or (b) UC + CALM ARC. In order to control for therapy time, participants in UC attended family education sessions while participants in UC + CALM ARC received the CALM ARC intervention. After randomization, participants completed a pre-treatment symptom assessment, followed by seven weeks of either CALM ARC with weekly symptom assessment or matched weekly assessment only in the UC condition, post-treatment assessment and 6-month follow-up assessment.

Randomization occurred in a standardized 6-week cycle to one condition or another (NIDA, 2003) in order to accrue sufficient