Published in final edited form as:

Am J Drug Alcohol Abuse. 2011 January ; 37(1): 43–47. doi:10.3109/00952990.2010.535581.

Anxiety Sensitivity and Illicit Sedative Use Among Opioid-Dependent Women and Men

Bridget A. Hearon, Amanda W. Calkins, Daniella Halperin, R. Kathryn McHugh, Heather W. Murray, and Michael W. Otto

Boston University

Abstract

Objectives—Research has suggested that individuals with elevated anxiety sensitivity (the fear of benign bodily sensations associated with anxiety) are more likely to use substances to cope with distress, particularly substances with arousal-dampening effects such as benzodiazepines and other sedatives. Such coping motives may also vary as a function of gender, with women more likely to use substances for coping (self-medicating) purposes. Given these findings, we hypothesized that anxiety sensitivity (AS) would be associated with illicit sedative use in an opioid-dependent sample and that gender would moderate this relationship, with a greater association among women.

Method—Participants were 68 opioid-dependent patients recruited from a methadone maintenance clinic. A logistic regression was used to determine whether AS was associated with presence or absence of a history of illicit sedative use.

Results—AS was significantly associated with sedative use and this relationship was moderated by gender; elevated AS was associated with greater sedative use only in women.

Conclusion—The presence of elevated AS is related to greater illicit use of sedatives in women but not in men. Women may be more susceptible to seek sedatives as a means of coping with unpleasant, anxious sensations.

Keywords

Anxiety Sensitivity; Sedative Use; Gender

The reduction of negative affect can be a powerful reinforcer of substance use behavior, especially in the context of strong expectancies of relief from these negative mood states [1]. Accordingly, elevated sensitivity to distress may motivate the use of illicit substances to reduce or avoid somatic or emotional distress. For example, anxiety sensitivity—the fear of anxiety-related bodily sensations that are interpreted negatively [2]—is associated with coping motives for substance use (e.g., [3–5]), relapse to use [6], and drop-out from substance abuse treatment [7].

Research to date suggesting that elevated AS is associated with greater substance use [8] supports a tension-reduction hypothesis for drug use with the implication that those individuals with high anxiety sensitivity (AS) may, in part, use substances to reduce unpleasant anxiety symptoms. Indeed, expectancy of tension-reduction was the strongest

correlate of self-medication with alcohol in a study of individuals with panic disorder [9]. Moreover, AS may serve as an amplifier of distressing states increasing the motivation to use to reduce or avoid these states (see [4]). AS is also hypothesized to be differentially related to the risk for abuse of certain classes of drugs (e.g., sedatives vs. stimulants), such that those with greater AS will select more arousal dampening agents (e.g, sedatives, hypnotics, or tranquilizers) of abuse [10, 11].

Additionally, several important gender differences emerge in research on AS and sedative use. On average, women tend to score higher on measures of AS [2] and have a substantially elevated prevalence of affective disorders relative to men [12]. For example, component analyses of AS (studying physical, psychological, and social consequences) have shown that females score higher than males on the physical component and AS overall [13]. In addition, research on drug prescription trends in the United States shows that women are more likely to be prescribed a benzodiazepine or other sedatives than men [14]. Finally, several studies have suggested that women are more likely to use substances to cope with negative or anxious affective states (e.g., [13]). If women are more likely to use substances to cope with these states, the association between AS and illicit sedative use may be more robust for women relative to men. For example, in experimental paradigms negative affect was associated with greater craving for substances among women [15, 16] and treatment targeting negative affect was shown to be more efficacious for decreasing substance use in women in a pilot study [17]. Studies of alcohol use and coping motives have been equivocal with regard to gender differences (see [18, 19]). However, in a study of subtypes of non-medical prescription drug use, women were significantly more likely to use sedatives to self-medicate, whereas men were significantly more likely to use for recreational purposes [20].

At this time, further research is needed to test the association between AS and sedating substances in particular and to evaluate the nature of gender differences in the association between AS and sedative use. Moreover, given that many studies of this association have relied on college student populations, evaluation in samples with substance dependence is needed as the relationship between AS and substance use may be different at varying levels of substance abuse severity. Thus, the aims of the present study were twofold: (1) to test the association between AS and illicit sedative use in a sample of substance dependent individuals, and (2) to examine whether this association was moderated by gender. We hypothesized that those with higher AS would endorse greater sedative use and that this effect would be moderated by gender such that the effect would be stronger among women relative to men.

MATERIALS AND METHODS

Participants

The sample consisted of 68 participants recruited from two urban methadone maintenance clinics as part of a randomized controlled trial comparing two outpatient psychological interventions for illicit polysubstance use in an opioid-dependent population. Participants were included in the present study if they met *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition* [21] diagnostic criteria for current opioid dependence, were continuing to use illicit drugs while on a stable dose of methadone (defined as a consistent

dose for 2 weeks), and met criteria for chronic stress (defined as unemployment or underemployment, or the presence of an Axis I disorder other than substance dependence). Participants were excluded if they had a recent suicide attempt, an unstable medical illness that could potentially interfere with participation in treatment, had ever been diagnosed with a psychotic disorder, or endorsed current symptoms of bipolar disorder. Table 1 provides sample descriptive statistics by gender. The sample was 51.5% female ($n = 35$) and the mean age was 42.0 years ($SD = 10.6$). The sample was diverse with respect to race with 63.2% identifying as White ($n = 43$) and 36.8% identifying as Black ($n = 25$); 8.8% identified as Hispanic or Latino/a ($n = 6$). The sample endorsed high levels of comorbid anxiety disorders in a structured clinical interview, with 73% meeting criteria for a current anxiety disorder. Women and men in this sample did not differ with regards to rates of anxiety disorders overall; however, there was a significant difference in post-traumatic stress disorder (PTSD) with a higher rate among women (*Fisher's Exact Test* $p = .01$, two tailed).

All participants provided informed consent after an initial screening to determine eligibility. Participants eligible for the study completed a pre-treatment baseline assessment consisting of both clinician-administered and self-report measures described below. All study procedures were approved by the Institutional Review Boards at Boston University and Massachusetts General Hospital.

Study Measures

The Anxiety Sensitivity Index is a 16-item self-report questionnaire that assesses fears of negative consequences of anxiety sensations [2]. Each item is rated on a 5-point Likert scale, and the total score is the sum of the scores on these items. Analyses of the psychometric properties of the Anxiety Sensitivity Index have demonstrated good reliability and validity in adult samples [2].

The Addiction Severity Index is a semi-structured clinical interview comprised of 200 items that measure the severity of problems in seven functional domains that are frequently affected in patients with substance use disorders [22]. Composite scores are calculated for each area of functioning, including medical and psychiatric status, employment/support, drug and alcohol use, legal status, and family/social relationships. The Addiction Severity Index provides an overall severity rating for the past 30 days prior to assessment and lifetime. The Addiction Severity Index has been shown to have strong test-retest reliability and concurrent, predictive, and discriminate validities in diverse samples [23]. For this study, patient reports of sedative, hypnotic, or tranquilizer use in the drug use section were used as the primary outcome measure. Sedative use was defined as one or more years of regular use (3 or more times per week) or problematic use such that it led to interference in daily functioning (e.g., ability to work or carry out household tasks). The term sedative was used to describe any substance that falls into the sedative, hypnotic, or tranquilizer category of the Addiction Severity Index. These include all drugs classified as benzodiazepines, such as diazepam, alprazolam, and clonazepam as well as other sedative and tranquilizer drugs. Only illicit use of these substances was recorded.

Statistical Analysis

Lifetime history of sedative use was operationalized as a dichotomous variable indicating one or more years of regular use (i.e., using three or more times per week or problematic use) of a sedative, hypnotic, or tranquilizer based on responses on the Addiction Severity Index. Given the influence of various factors in drug choice, such as availability and cost, sedative use was defined dichotomously to attempt to distinguish individuals with and without a history of regular sedative use consistent with the definition used on the Addiction Severity Index. The association between anxiety sensitivity and sedative use was examined with logistic regression analyses. In order to evaluate gender as a moderator of this association, an interaction term for gender and ASI was calculated and entered into the regression analysis. All analyses were conducted using SPSS for Windows (rel, 11.0.1.2001. Chicago: SPSS Inc).

RESULTS

The mean Anxiety Sensitivity Index score was 30.4 ($SD = 15.5$) and 48.5% ($n = 33$) of the sample reported lifetime sedative abuse. There were no significant differences between men and women on days of sedative use in the past 30 days ($t(68) = -0.13$, ns), years of sedative use ($t(68) = 0.69$, ns), or lifetime presence of sedative abuse ($\chi^2(67) = 0.96$, ns). Women had slightly elevated Anxiety Sensitivity Index scores relative to men (mean difference = 5.4); however, this difference was not significant ($t(68) = 1.47$, ns).

Results of the logistic regression indicated that Anxiety Sensitivity Index was associated with sedative use ($B = 0.14$, Wald $\chi^2(67) = 6.26$, $p = .05$). The moderator analysis yielded a significant interaction effect, indicating a moderator effect of gender ($B = -.09$, Wald $\chi^2(67) = 5.38$, $p = .05$). Specifically, Anxiety Sensitivity Index scores were associated with sedative use in women, but not in men. Moreover, women who had a history of sedative use had significantly higher Anxiety Sensitivity Index scores relative to those who did not (mean difference = 13.7; $t(33) = -2.41$, $p < .05$). Among men there was no significant difference between those who had a history of sedative use and those who did not (mean difference = -5.4; $t(31) = 1.30$, ns); see Figure 1. Because rates of PTSD were found to significantly differ between men and women, separate logistic regressions were used to examine the potential confounding influence of PTSD. Results indicated that Anxiety Sensitivity Index remained significantly associated with sedative use in women ($B = 0.05$, Wald $\chi^2(34) = 4.33$, $p < .05$) with the addition of PTSD, which was not significant ($B = 0.68$, Wald $\chi^2(34) = 0.82$, ns). In men, neither Anxiety Sensitivity Index ($B = 0.3$, Wald $\chi^2(32) = .92$, ns) nor the presence of Post Traumatic Stress Disorder ($B = 1.23$, Wald $\chi^2(32) = 2.12$, ns) were significantly associated with sedative use.

DISCUSSION

Consistent with our hypotheses, anxiety sensitivity was significantly associated with illicit sedative use in a sample of opioid-dependent individuals. In addition, this association was moderated by gender. That is, among the many drugs that were selected for illicit use by this population, women presenting with a history of sedative use had significantly higher scores on measures of AS than did their non-sedative using counterparts, a relationship that did not

hold true for male participants. Presumably, this may reflect a greater tendency to cope with distress using sedating substances among women; however, direct tests of the impact of coping motives on this association are needed. This finding supports recent research suggesting that misuse of prescription sedatives for self-medication purposes is more common among women relative to men [20].

This finding has implications for both prevention and treatment of substance use disorders. In particular, interventions aimed to increase tolerance to distress (e.g., interoceptive exposure for AS) may be of particular importance for women given the link between AS and sedative use. Moreover, given the high rates of comorbidity with anxiety disorders, women with co-occurring anxiety and substance use disorders may be particularly vulnerable to using substances to cope with anxiety symptoms and thus targeting this sensitivity in treatment may be crucial to both anxiety and substance use outcomes. For example, among samples of patients with panic disorder, rates of alcohol dependence are particularly elevated overall relative to norm expectations with women showing more elevated rates than men [24].

Gender differences in AS has not been a consistent finding in the substance use literature, perhaps due to heterogeneity of the studies conducted. For example, Lawyer et al. (2002) found that elevated AS was associated with a greater tendency for men to use alcohol in an attempt to reduce unpleasant mood states; however, women with elevated AS were more likely than men to use nicotine for coping purposes in another study [13]. There may be several reasons for the equivocal findings in the literature. First, as tension-reduction hypotheses suggest, the psychoactive effects of the substance may be particularly important to this association, and thus studies of different substances may reflect different motives (e.g., alcohol has both euphoria-inducing and sedating effects). Second, individual difference variables may be associated with the type of substance chosen to remediate symptoms, such as the choice between licit (i.e., alcohol, nicotine) and illicit (e.g., benzodiazepines) substances. Finally, many studies have relied on college or unselected samples, which differ from samples with substance use disorders. Future research will be needed to further clarify the nature of this association in both non-clinical and substance dependent samples.

Limitations of this study include the cross-sectional nature of analyses and the inclusion of a sample that represents a particularly severe subset of the substance use disordered population. Studies of this association using prospective designs and including participants with less severe substance use are needed to clarify the nature of this association and its generalizability.

In summary, our data provide support for previous research demonstrating that individuals with elevated AS may be at a greater risk of engaging in regular use of sedatives. This result was characterized by a strong, positive association between AS and sedative use in women and no association between these variables in men. The association between AS and sedative use is of particular importance given the emergence of significant prescription drug misuse and abuse in the US in recent years (e.g., [25, 26]). Thus, further research on this association that specifically tests mediating variables, such as coping motives, and evaluates

the causal direction of this association in a prospective design is needed to further elucidate the nature of this association.

References

1. Cooper ML, et al. Drinking to regulate positive and negative emotions: A motivational model of alcohol use. *Journal of Personality and Social Psychology*. 1995; 69:990–1005. [PubMed: 7473043]
2. Peterson, RA.; Reiss, S. Anxiety Sensitivity Index Revised Test Manual. Palos Heights: International Diagnostic Systems; 1992.
3. DeHaas R, et al. Anxiety sensitivity and drug or alcohol use in individuals with anxiety and substance use disorders. *Addictive Behaviors*. 2001; 26(6):787–801. [PubMed: 11768545]
4. Kushner MG, et al. Anxiety mediates the association between anxiety sensitivity and coping-related drinking motives in alcoholism treatment patients. *Addictive Behaviors*. 2001; 26(6):869–885. [PubMed: 11768549]
5. Stewart SH, Zeitlin SB. Anxiety sensitivity and alcohol use motives. *Journal of Anxiety Disorders*. 1995; 9(3):229–240.
6. Brown RA, et al. Anxiety sensitivity: Relationship to negative affect smoking and smoking cessation in smokers with past major depressive disorder. *Addictive Behaviors*. 2001; 26(6):887–899. [PubMed: 11768550]
7. Lejuez CW, et al. Anxiety sensitivity: a unique predictor of dropout among inner-city heroin crack/cocaine users in residential substance use treatment. *Behavior Research and Therapy*. 2008; 46(7): 811–818.
8. Stewart SH. Alcohol abuse in individuals exposed to trauma: A critical review. *Psychological Bulletin*. 1996; 120:83–112. [PubMed: 8711018]
9. Kushner MG, et al. Individual differences predictive of drinking to manage anxiety among non-problem drinkers with panic disorder. *Alcoholism, Clinical and Experimental Research*. 2000; 24(4):448–458.
10. McNally, RJ. Anxiety sensitivity is distinct from trait anxiety. In: Rapee, RM., editor. *Current controversies in the anxiety disorders*. Guilford; New York: 1996. p. 214–227.
11. Stewart SH, Kushner MG. Introduction to the special issue on anxiety sensitivity and addictive behaviors. *Addictive Behaviors*. 2001; 26:775–785. [PubMed: 11768544]
12. Kessler, RC. The epidemiology of depression among women. In: Keyes, CLM.; Goodman, SH., editors. *Women and depression: A handbook for the social, behavioral, and biomedical sciences*. Cambridge University Press; New York: 2006. p. 22–37.
13. Stewart SH, et al. Anxiety sensitivity and self-reported reasons for drug use. *Journal of Substance Abuse*. 1997; 9:223–240. [PubMed: 9494951]
14. Wysowski DK, Baum C. Outpatient use of prescription sedative-hypnotic drugs in the United States, 1970 through 1989. *Archives of Internal Medicine*. 1991; 151(9):1779–1783. [PubMed: 1888243]
15. Monti, PM., et al. Coping and social skills training. In: Hester, RK.; Miller, WR., editors. *Handbook of alcoholism treatment approaches: Effective alternatives*. Allyn & Bacon; Needham Heights: 1995. p. 221–241.
16. Rubonis AV, et al. Alcohol cue reactivity and mood induction in male and female alcoholics. *Journal of Studies on Alcohol*. 1994; 55(4):487–494. [PubMed: 7934057]
17. Pollack MH, et al. A novel cognitive-behavioral approach for treatment-resistant drug dependence. *Journal of Substance Abuse Treatment*. 2002; 23(4):335–342. [PubMed: 12495795]
18. Lawyer SR, et al. Heavy drinking among college students is influenced by anxiety sensitivity, gender, and contexts for alcohol use. *Journal of Anxiety Disorders*. 2002; 16:165–173. [PubMed: 12194542]
19. Timko C, Finney JW, Moos RH. The 8-year course of alcohol abuse: gender differences in social context coping. *Alcoholism, Clinical and Experimental Research*. 2005; 29(4):612–621.
20. McCabe SE, Boyd CJ, Teter CJ. Subtypes of nonmedical prescription drug misuse. *Drug and Alcohol Dependence*. 2009; 102:63–70. [PubMed: 19278795]

21. Association, AP. Diagnostic and statistical manual of mental disorders (DSM-IV). Washington, D.C.: American Psychiatric Association; 1994.
22. McLellan AT, et al. The fifth edition of the Addiction Severity Index. *Journal of Substance Abuse Treatment*. 1992; 9(3):199–213. [PubMed: 1334156]
23. McLellan AT, et al. The addiction severity index at 25: origins, contributions, and transitions. *The American Journal of Addiction*. 2006; 15:113–124.
24. Otto MW, et al. Alcohol dependence in panic disorder patients. *Journal of Psychiatric Research*. 1992; 26:29–38. [PubMed: 1560407]
25. Blanco C, et al. Changes in the prevalence of non-medical prescription drug use and drug use disorders in the United States: 1991–1992 and 2001–2002. *Drug and Alcohol Dependence*. 2007; 90:252–260. [PubMed: 17513069]
26. McCabe SE, West B, Wechsler H. Trends in non-medical use of prescription drugs among U.S. college students from 1993–2001. *Addiction*. 2007; 102:455–465. [PubMed: 17298654]

FIGURE 1.

Anxiety sensitivity and sedative use by gender. Mean ASI scores among men and women with and without a history of sedative use. $*p < .05$.

Table 1

Sample Descriptives by Gender

	Men (n = 33)	Women (n = 35)	<i>t</i>	<i>p</i> [*]
Mean Age	40.3	43.6	1.26	<i>ns</i>
Days of sedative use in the past 30 days	4.4	5.0	−0.13	<i>ns</i>
Years of regular sedative use	1.9	2.5	0.69	<i>ns</i>
Anxiety Sensitivity Index total score	27.3	33.2	1.47	<i>ns</i>
Percentage with any anxiety disorder	70%	80%		<i>ns</i>
Panic Disorder/Ag.	30%	40%		<i>ns</i>
Post Traumatic Stress Disorder	27%	60%		.01
Social Anxiety Disorder	12%	20%		<i>ns</i>
Generalized Anxiety Disorder	18%	23%		<i>ns</i>
Obsessive Compulsive Disorder	3%	9%		<i>ns</i>

* Fisher's Exact Tests were used for comparisons among categorical variables