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Exploring anxiety sensitivity in the relationship between pain intensity and opioid misuse among opioid-using adults with chronic pain

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ABSTRACT

Opioid misuse is a significant public health problem. Chronic pain is one highly prevalent factor that is strongly associated with increased risk for opioid misuse. Anxiety sensitivity (fear of anxiety related physical sensations) is an individual difference factor consistently linked to pain experience, and separately, heroin use. The present study examined if anxiety sensitivity may be one factor related to the relationship between pain intensity and opioid misuse among opioid-using adults with chronic pain. Results indicated that anxiety sensitivity total score was significantly associated with the relationship between pain intensity and current opioid misuse, as well as pain intensity and severity of opioid dependence. Overall, results suggest that anxiety sensitivity may be an important assessment and intervention target to ultimately reduce the rates of opioid misuse among adults with chronic pain.

1. Introduction

Misuse of opioid analgesic medication is a significant public health problem, affecting over 11 million adults in 2016 alone (Center for Disease Control and Prevention, 2017; Rudd et al., 2016). Prescription opioid misuse is associated with functional impairment (Fitzcharles et al., 2011), medical side effects (i.e. constipation, nausea; Papaleontiou et al., 2010), increased pain (Garland et al., 2013), and significant economic cost (Strassels, 2009). Unfortunately, there are no well-validated treatments for the prevention of opioid misuse and current treatments for opioid use disorder, although effective for many patients, still have much room for improvement (Lee et al., 2018; Weiss et al., 2011). Therefore, there is a critical need to understand factors that may increase the risk of opioid misuse to inform the development of novel interventions for this population.

One factor that has been consistently associated with the use and misuse of opioids is chronic pain (Dowell et al., 2016). Chronic pain, defined as persistent pain lasting for at least 3 months (Treede et al., 2015), is often managed with prescription opioid medications. Pain is also a significant risk factor for opioid misuse; it is associated with the initiation of prescription opioid misuse (Novak et al., 2016) and the development of opioid use disorder (Blanco et al., 2016). A systematic review of the literature found that between 21% and 29% of individuals with chronic pain misuse opioids (Vowles et al., 2015). More recent work is in line with these findings (Rogers et al., 2018).

Anxiety sensitivity, defined as fear of anxiety-related physical sensations (Reiss and McNally, 1985), is one individual difference factor that may be associated with the relationship between pain and opioid misuse among individuals with chronic pain. Anxiety sensitivity is comprised of a global, as well as three first order sub dimensions, including Cognitive Concerns (fear of cognitive dyscontrol), Physical Concerns (fears of adverse physical outcomes), and Social Concerns (fears of public display of anxiety symptoms; Taylor et al., 2007). Research suggests that individuals with chronic pain and higher levels of anxiety sensitivity report greater pain-related functional impairment than those with lower anxiety sensitivity (Asmundson and Norton, 1995; McCracken and Keogh, 2009). Additionally, among individuals with chronic pain, anxiety sensitivity has been associated with greater pain-related fear as well as greater avoidance of pain-eliciting situations (Asmundson and Taylor, 1996; Zvolensky et al., 2001).

Significantly less is known about the relationship between pain, anxiety sensitivity and opioid misuse. Previous work has primarily examined anxiety sensitivity in the context of heroin use and found that people who use heroin (compared to those who use multiple drugs)

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reported the highest levels of anxiety sensitivity (Lejuez et al., 2006). Anxiety sensitivity has also been identified as an individual difference factor associated with increased dropout from heroin treatment (Lejuez et al., 2008) and more severe opioid use problems (Rogers et al., in press). Some initial work has examined anxiety sensitivity as a treatment target for heroin use and found that targeting anxiety sensitivity was associated with decreased heroin craving (Tull et al., 2007). This study was a single case whereby a single individual meeting criteria for heroin use disorder completed a 6-session in-person treatment targeting anxiety sensitivity (with interoceptive exposure and skills training), and outcomes were measured at the end of treatment.

Theoretically, as individuals with chronic pain experience more severe pain, they may be more apt to interpret those symptoms as potentially catastrophic and further pain-eliciting, leading to heightened anxiety sensitivity and greater avoidance. In turn, to reduce the distress associated with elevated anxiety sensitivity and catastrophic interpretations of pain, individuals may use and misuse opioids to a greater degree. Indeed, catastrophizing has been associated with greater risk of opioid misuse (Martel et al., 2013). This perspective suggests that heightened anxiety experienced in the context of pain may present a strong aversive state that is highly motivating of opioid use for relief. It can be theorized that chronic opioid use dysregulates homeostatic pain mechanisms (Chu et al., 2006), and anxiety sensitivity may be involved in this pathway by further dysregulating pain processing.

The current study examined anxiety sensitivity as one explanatory factor associated with t pain intensity and opioid misuse among opioid-using adults with chronic pain. It was hypothesized that anxiety sensitivity would significantly mediate the relationship between pain intensity and current opioid misuse and severity of opioid dependence. It was hypothesized that these effects would be apparent over theoretically relevant covariates, including age, gender, income, and education. Additionally, as an exploratory aim of the current study, lower-order dimensions of anxiety sensitivity (Cognitive, Social, and Physical) were examined as mediators. No specific hypotheses were made for the exploratory aims given the developmentally young state of the empirical literature.

2. Method

2.1. Participants

Participants were 429 adults (73.9% female, M_{age} = 38.32 years, SD = 11.07) recruited via an online survey that reported current chronic pain and opioid use. Eligible participants were between the ages of 18–64, reported current moderate to severe chronic pain that persisted at least 3 months, and current use of opioid pain medication. Participants were excluded if they were younger than 18 years, a non-English speaker (to ensure comprehension of the study questions), and were unable to provide informed, voluntary, written consent to participate.

Most of the sample was White/Caucasian (72.7%), with 10.0% identifying as Hispanic/Latino, 7.0% Black/African American, 3.3% Asian/Pacific Islander, 1.4% Native American/Alaska Native, 3.3% multiracial, and 2.3% other. A large proportion of participants (41.6%) reported completing an associate degree or higher. Over a quarter of the sample (30.3%) reported attaining a high school diploma, while 22.4% percent reported “some college,” and the remaining 5.8% did not complete high school. The median income bracket fell within the range of $35,999 to $49,999. In terms of pain, participants reported an average 7.33/10 for pain intensity, and reported an average of 121.7/180 days with chronic pain.

2.2. Measures

2.2.1. Demographics questionnaire

The demographics questionnaire collected sociodemographic information, including gender, race, age, education level, income, and marital status.

2.2.2. Current opioid misuse measure

The Current Opioid Misuse Measure (COMM) is a 17-item questionnaire developed to detect opioid misuse among chronic pain patients on opioid therapy (Butler et al., 2007). The items are rated on a 5-point scale from 0 (*never*) to 4 (*very often*) and are summed to yield a total score. Test-retest reliability has been established and construct validity was demonstrated via positive correlations with urine toxicology results (Butler et al., 2007; Wasan et al., 2007). The distribution of the COMM total score suggested a positive skew (skewness = 1.20). The COMM total score was used as a criterion variable (α = 0.97).

2.2.3. Severity of dependence scale

The Severity of Dependence Scale (SDS) is a 5-item measure of the level of dependence to substances (e.g. heroin, cocaine, amphetamine) and has also been validated for opioid use (Gossop et al., 1995). In the current study, responses were specifically anchored to problems associated specifically with opioid use. Responses are rated on a 4-point scale from 0 (*Never*) to 3 (*Always*) and are summed to generate a total score (Iraurgi Castillo et al., 2010). The distribution of the SDS total score suggested a positive skew (skewness = 1.29). SDS total score was used as a criterion variable (α = 0.86).

2.2.4. Graded chronic pain scale

The Graded Chronic Pain Scale (GCPS) is an 8-item measure of self-reported pain intensity and pain disability (Von Korff et al., 1992). Pain intensity items are rated on 10-point scale from 0 (*No pain*) to 10 (*Pain as bad as could be*) while pain disability items are rated on a 10-point scale from 0 (*No interference*) to 10 (*Unable to carry on activities*). Higher scores reflect greater pain intensity and disability. The GCPS pain intensity (α = 0.84) scale was used a predictor variable.

2.2.5. Anxiety Sensitivity Index-3

The Anxiety Sensitivity Index-3 (ASI-3) is an 18-item self-report measure of sensitivity to and fear of anxiety-related symptoms and sensations (Taylor et al., 2007). Respondents indicate their level of concern about the possible negative consequences of anxiety-related symptoms and sensations on a 5-point scale from 0 (*Very little)* to 4 (*Very much*). The ASI-3 was derived from the original ASI (Reiss and McNally, 1985) and has sound psychometric properties, including excellent internal consistency, predictive validity, and reliability (Taylor et al., 2007). The ASI-3 total score (α = 0.97) and the three lower-orders factors (α = 0.92 to 0.95) were used as mediator variables.

2.3. Procedure

Participants were recruited nationally through Qualtrics, an online survey management system. Any interested adult with a Qualtrics Panels account (program that invites individuals to participate in surveys) that endorsed moderate to severe chronic pain and current use of opioid pain medication were sent a survey advertisement. Respondents were screened for eligibility using self-report items (“Have you had persistent, chronic pain for at least 3 months?“; “How severe was your chronic pain?“; “Do you currently use prescription opioid medications?“). In terms of pain criteria, participants indicated if they had “none”, “very mild”, “mild”, “moderate”, or “severe” pain, scored from 1 to 5. Eligible participants were directed to the online anonymous survey. Participants provided informed consent prior to completing the survey, which took approximately 30 min. A total of 541 participants signed consent, and the current manuscript included 429 individuals who were not missing on variables of interest; Participants could opt to receive their payment in varying forms (e.g., cash-based incentives [i.e., gift cards], rewards miles, rewards points, etc.). While the forms were different, the level of compensation remained consistent across respondents ($4.20). Data were examined for completeness and for outliers to ensure data validity. The study protocol was approved by the Institutional Review Board at the University of Houston.

2.4. Analytic strategy

First, sample descriptive statistics and zero-order correlations among study variables were examined. Second, indirect effect analyses were conducted in SPSS version 24 using the PROCESS macro (Hayes, 2013). Specifically, anxiety sensitivity was examined as a mediator between pain intensity and opioid misuse variables. Both direct, total, and indirect effects were reported. Post-hoc multiple-indirect effect analyses examined the lower order dimensions of anxiety sensitivity in the same model (i.e. physical, cognitive, and social subscales) as multiple-mediators of pain intensity and opioid misuse factors. The confidence intervals (CIs) for indirect effects were subjected to 10,000 bias-corrected bootstrap re-samplings and 99-percent CIs were estimated (Hayes, 2009; Preacher and Hayes, 2008, 2004). Statistical significance of the effects is assumed if the CIs around their product do not include zero (Preacher and Hayes, 2008). Completely standardized point estimates were used as a measure of effect size for the current study.

3. Results

3.1. Bivariate correlations

Zero-order correlations among study variables are presented in Table 1. Pain intensity was positively correlated with the global anxiety sensitivity construct ($r = 0.18$), anxiety sensitivity-physical ($r = 0.18$), anxiety sensitivity-cognitive ($r = 0.15$), anxiety sensitivity-social ($r = 0.18$), current opioid misuse ($r_s = 0.12$) and severity of opioid dependence ($r_s = 0.16$).

3.2. Primary analyses

Opioid Misuse. In relation to pain intensity and opioid misuse, there was a significant total effect of pain intensity (See Table 2; $b = 0.74$, $t = 5.37$, $p < 0.001$, 99%CI [0.39, 1.10]). There was also a significant indirect effect of pain intensity, through the global anxiety sensitivity construct, on opioid misuse ($b = 0.43$, SE = 0.10, 99%CI [0.19, 0.68]),

Table 1
Descriptive statistics and correlations among study variables.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Age [a]	1	−0.041	0.032	−0.010	−0.028	−0.242***	−0.151**	−0.297***	−0.241***	0.164**	−0.317***	−0.170***
2. Male [a]		1	−0.994***	0.057	0.063	0.121*	0.112*	0.163**	0.069	−0.045	0.171***	0.195***
3. Female [a]			1	−0.059	−0.059	−0.114*	−0.105*	−0.157**	−0.062	0.057	−0.180***	−0.192***
4. Education [a]				1	0.409***	0.096*	0.074	0.102*	0.098*	−0.024	0.124*	0.075
5. Income [a]					1	0.048	0.039	0.042	0.054	0.002	0.093	0.055
6. ASI-3 [d]						1	0.946***	0.952***	0.947***	0.178***	0.664***	0.488***
7. ASI-3 Physical [d]							1	0.852***	0.840***	0.175***	0.606***	0.455***
8. ASI-3 Cognitive [d]								1	0.853***	0.147**	0.667***	0.486***
9. ASI-3 Social [d]									1	0.184***	0.621***	0.457***
10. GCPS-I[b]										1	0.116*	0.163***
11. COMM[c]											1	0.599***
12. SDS[c]												1
Mean/n	38.32	111	317	4.35	5.50	27.42	9.44	8.11	9.87	21.88	17.95	4.34
Standard Deviation (%)	11.07	25.9	73.9	1.55	2.08	21.40	7.41	7.59	7.56	5.45	17.18	3.80

Note. N = 429; *$p < 0.05$, **$p < 0.01$., ***$p < 0.001$. [a] Covariate. [b] Predictor. [c] Outcome. [d] Mediator. Spearman's correlations coefficients for variables with COMM and SDS, and Pearson's correlation coefficients for all other variables. Age = age in years; Male = % listed as male (Coded: 0 = transgender or female, 1 = male); Female = % listed as female (Coded: 0 = transgender or male, 1 = female); ASI-3 = Anxiety Sensitivity Index-3 Total Score (Taylor et al., 2007); ASI-3 Physical = Anxiety Sensitivity Index-3 Physical Subscale (Taylor et al., 2007); ASI-3 Cognitive = Anxiety Sensitivity Index-3 Cognitive Subscale (Taylor et al., 2007); ASI-3 Social = Anxiety Sensitivity Index-3 Social Subscale (Taylor et al., 2007); GCPS-I = Graded Chronic Pain Scale-Pain Intensity Subscale (Von Korff, Ormel, Keefe and Dworkin, 1992); COMM = Current Opioid Misuse Measure (Butler et al., 2007); SDS = Severity of Dependence Scale (Gossop et al., 1995; Iraurgi, González, Lozano, Landabaso and Jiménez, 2010).

Table 2
Indirect effect of chronic pain intensity on current opioid misuse and dependence severity via anxiety sensitivity.

Y	Path	R^2	*b*	*SE*	*t*	*p*	LLCI	ULCI
1	GCPS-I→ ASI-3 (*a*)	.128	0.918	0.181	5.06	< .001	0.449	1.387
	ASI-3 → COMM (*b*)	.501	0.464	0.030	15.68	< .001	0.387	0.540
	GCPS-I → COMM (*c'*)		0.318	0.114	2.80	.005	0.024	0.612
	GCPS-I → COMM (*c*)	.211	0.744	0.139	5.37	< .001	0.385	1.102
	GCPS-I → ASI-3→ COMM (*ab*)		0.426	0.096			0.189	0.682
2	ASI-3 → SDS(*b*)	.337	0.083	0.008	10.95	< .001	0.063	0.102
	GCPS-I → SDS (*c'*)		0.101	0.029	3.49	< .001	0.026	0.176
	GCPS-I → SDS(*c*)	.149	0.177	0.032	5.56	< .001	0.094	0.259
	GCPS-I → ASI-3→ SDS (*ab*)		0.076	0.018			0.033	0.126

Note. N for analyses is 429 cases. Path a is equal in all cases Y; therefore, it presented only once to avoid redundancies. The standard error and 95% CI for the indirect effects (ab) are obtained through bootstrapping with 10,000 re-samples. a path = Effect of X on M; b paths = Effect of M on Y; c' paths = Direct effect of X on Y controlling for M; c paths = Total effect of X on Y. ASI-3 = Anxiety Sensitivity Index-3 Total Score (Taylor et al., 2007); GCPS-I = Graded Chronic Pain Scale-Pain Intensity Subscale (Von Korff, Ormel, Keefe and Dworkin, 1992); COMM = Current Opioid Misuse Measure (Butler et al., 2007); SDS = Severity of Dependence Scale (Gossop et al., 1995; Iraurgi, González, Lozano, Landabaso and Jiménez, 2010); Covariates included age, gender, education, and income.

Table 3
Indirect effect of pain intensity and disability on opioid misuse and dependence severity via anxiety sensitivity subscales.

Y	Path	ASI-3 Physical						ASI-3 Cognitive						ASI-3 Social					
		b	*SE*	*t*	*p*	LLCI	ULCI	*b*	*SE*	*t*	*p*	LLCI	ULCI	*b*	*SE*	*t*	*p*	LLCI	ULCI
1	GCPS-I→ ASI-3 (*a*)	0.291	0.065	4.51	< .001	0.124	0.458	0.300	0.063	4.75	< .001	0.136	0.463	0.327	0.064	5.09	< .001	0.161	0.494
	ASI-3→ COMM (*b*)	0.421	0.171	2.47	.014	−0.021	0.862	0.849	0.178	4.76	< .001	0.387	1.310	0.126	0.166	0.76	.448	−0.303	0.555
	GCPS-I→ COMM (*c'*)	0.326	0.113	2.88	.004	0.033	0.618												
	GCPS-I→ COMM (*c*)	0.744	0.139	5.37	< .001	0.385	1.102												
	GCPS-I→ COMM (*ab*)	0.123	0.047			0.022	0.270	0.254	0.075			0.091	0.465	0.041	0.044			−0.075	0.167
2	ASI-3→ SDS(*b*)	0.067	0.044	1.46	.145	−0.049	0.177	0.150	0.046	3.28	.001	0.032	0.268	0.035	0.042	0.82	.413	−0.075	0.145
	GCPS-I→ SDS (*c'*)	0.102	0.029	3.52	< .001	0.027	0.177												
	GCPS-I→ SDS(*c*)	0.177	0.032	5.56	< .001	0.094	0.259												
	GCPS-I→ SDS (*ab*)	0.019	0.013			−0.012	0.057	0.045	0.017			0.008	0.094	0.011	0.013			−0.023	0.050

Note. N for analyses is 429 cases. Path a is equal in all cases Y; therefore, it presented only once to avoid redundancies. The standard error and 95% CI for the indirect effects (ab) are obtained through bootstrapping with 10,000 re-samples. a path = Effect of X on M; b paths = Effect of M on Y; c' paths = Direct effect of X on Y controlling for M; c paths = Total effect of X on Y. ASI-3 Physical = Anxiety Sensitivity Index-3 Physical Subscale (Taylor et al., 2007); ASI-3 Cognitive = Anxiety Sensitivity Index-3 Cognitive Subscale (Taylor et al., 2007); ASI-3 Social = Anxiety Sensitivity Index-3 Social Subscale (Taylor et al., 2007); GCPS-I = Graded Chronic Pain Scale-Pain Intensity Subscale (Von Korff, Ormel, Keefe and Dworkin, 1992); COMM = Current Opioid Misuse Measure (Butler et al., 2007); SDS = Severity of Dependence Scale (Gossop et al., 1995; Iraurgi, González, Lozano, Landabaso and Jiménez, 2010); Covariates included age, gender, education, and income.

completely standardized point estimate (β = 0.14). After accounting for the indirect effects of anxiety sensitivity, the direct effect of pain intensity on opioid misuse was significant (b = 0.32, t = 2.80, p = 0.005, 99%CI 0.02, 0.61]).

Severity of Dependence. For severity of opioid dependence, there was a significant total effect of pain intensity (b = 0.18, t = 5.56, p < 0.001, 99%CI [0.09, 0.26]). The indirect effect of pain intensity via anxiety sensitivity was also significant (b = 0.08, SE = 0.02, 99%CI [0.03, 0.13]), completely standardized point estimate (β = 0.11). After accounting for the indirect effects of the mediator, the direct effect of pain intensity on severity of opioid dependence was significant (b = 0.10, t = 3.49, p < 0.001, 99%CI [0.03, 0.18]).

3.3. Post-hoc multiple indirect effect analyses

Additional analyses examining the lower order factors of anxiety sensitivity revealed significant indirect effects of pain intensity on opioid misuse via the anxiety sensitivity physical (See Table 3; b = 0.12, SE = 0.05, 99% CI [0.02, 0.27]) and cognitive (b = 0.25, SE = 0.08, 99% CI [0.09, 0.47]) subscales on current opioid misuse, completely standardized point estimates, (β = 0.04 and 0.08), respectively. For severity of opioid dependence, the lower order factors of anxiety sensitivity revealed significant indirect effects of pain intensity on severity of opioid dependence via the anxiety sensitivity cognitive subscale (b = 0.05, SE = 0.02, 99% CI [0.008, 0.094]), completely standardized point estimate (β = 0.06).

4. Discussion

The current study examined anxiety sensitivity in the relationship between pain severity and opioid misuse among opioid-using adults with chronic pain. Results from the study indicated that the anxiety sensitivity global score was significantly associated with the relationship between pain severity and current opioid misuse, as well as pain severity and severity of opioid dependence. Although the effects sizes were characterized as small (0.11 and 0.14) by conventional standards, importantly, these results were evident over and above age, gender, income, and education. These results are in line with past research suggesting that anxiety sensitivity is associated with both pain (Asmundson and Norton, 1995) and opioid use (Lejuez et al., 2008), and uniquely extends this work to suggest that anxiety sensitivity may be an important mechanism linking the experience of pain to opioid misuse. The allostatic load model (Koob and Le Moal, 2001) provides a conceptual framework to interpret the results of the current study. This model suggests that when the body is under constant stress and subsequent attempts at homeostasis, it shut off" homeostatic mechanisms due to inability to regulate stress. As the model pertains to substance use-pain comorbidity, when individuals experience pain, they may be more apt to turn to opioids for pain relief. Anxiety sensitivity serves to amplify the perceptions of pain, thereby contributing to greater dysregulation of pain-related and substance-related systems.

Although not core foci of the study, the findings focused on the lower-order dimensions of anxiety sensitivity warrant comment. Specifically, results from the multiple indirect effect models indicated that there are potentially differential patterns for the anxiety sensitivity sub-domains predicting opioid misuse. Anxiety sensitivity physical and cognitive concerns were associated with the relationship between pain severity and current opioid misuse, while the cognitive concerns subscale was the only subscale associated with severity of opioid dependence. However, while there was some evidence of differential effects of the lower-order factors, the bivariate associations were highly similar. Thus, it appears that the most parsimonious explanation at this stage of research development is that the global anxiety sensitivity global construct serves as the 'underlying' mechanism rather than specific lower-order dimensions for pain-opioid misuse relations.

The results from the current study also have potential clinical utility. It may be important for clinicians to assess anxiety sensitivity among chronic pain patients prior to prescribing opioids for chronic pain. Additionally, for those individuals with chronic pain actively misusing opioids, anxiety sensitivity may serve as an important treatment target. Although no work has explicitly targeted anxiety sensitivity in the context of chronic pain and opioid misuse, some work has demonstrated that anxiety sensitivity is a malleable construct that can successfully be targeted in therapy for opioid misuse. Specifically, a case study reported that targeting anxiety sensitivity among a heroin user reduced drug craving (Tull et al., 2007). Additionally, brief, computerized anxiety sensitivity interventions have been developed, and have shown success at reducing anxiety sensitivity (Schmidt et al., 2007). It may therefore be important to adapt these treatments for use among opioid-misusing adults with chronic pain to improve opioid-related outcomes.

The study is not without limitations. First, the data were cross sectional, prohibiting causal and temporal claims to be made. Future longitudinal and experimental research is needed to disentangle the temporal order of the observed relations. Second, the current study utilized a sample that is primarily comprised of female participants,

which may have biased results. Future studies should seek to replicate the results to generalize the findings to the larger population. Third, although measures were taken to ensure validity, no formal "attention" questions were used, and it is unlikely but still possible that results may have been partially due to random responding. Additionally, the sample, although recruited nationally, is primarily Caucasian, suggesting that the results may not generalize to more diverse populations, and future research should seek to replicate the results among different populations. Further, all measures for the current study were collected via self-report, and the results may be biased due to shared method variance. Additionally, due to the nature of the data collection, participants may not be indicative of a clinical chronic pain population. Future research should utilize multi-method assessments to characterize pain severity and opioid misuse to increase the confidence in the findings and replicate the findings among a clinical pain population (e.g., chronic pain patients in treatment). Additionally, due to data collection limitations, no information is available about type of pain or number of pain conditions, which may be relevant to better understanding opioid use and misuse.

Overall, results from the current study suggest that anxiety sensitivity may be an important construct in terms of better understanding the relation between pain intensity and opioid misuse among opioid using adults with chronic pain. This finding was observed with respect to two key points of the opioid misuse severity spectrum: the misuse of opioids and opioid dependence, suggesting that anxiety sensitivity may be a treatment target for both the prevention and treatment of opioid misuse and opioid use disorder. Better understanding of the nature of these relationships may provide novel intervention targets to ameliorate this ever-growing public health epidemic.

Conflict of Interests

None.

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Appendix A. Supplementary data

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