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# Suicide risk among male substance users in residential treatment: Evaluation of the depression–distress amplification model



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## ABSTRACT

Suicide is a leading cause of death and is significantly elevated among those with substance use disorders (SUDs). However, specific mechanisms of suicide in this population have been relatively understudied. The depression–distress amplification model posits that one pathway to increased suicide risk is through the intensification of depressive symptoms by anxiety sensitivity cognitive concerns. However, this model has not been tested in populations with SUDs. The current study tested the depression–distress amplification model of suicide risk and examined the relation of anxiety sensitivity to suicide risk in a sample of men in residential SUD treatment. Consistent with prior work, anxiety sensitivity cognitive concerns were significantly associated with suicide risk. Moreover, and consistent with the depression–distress amplification model, anxiety sensitivity cognitive concerns related to elevated suicide risk among those with a current major depressive episode specifically, above and beyond insomnia (another risk factor for suicide) and relevant covariates. The results of this study corroborate the relevance of anxiety sensitivity cognitive concerns and the depression–distress amplification model to suicide risk in an at-risk clinical sample of SUD patients. Findings suggest the importance of assessing anxiety sensitivity cognitive concerns and targeting this vulnerability through brief interventions to reduce suicide risk.

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## 1. Introduction

Suicide is a major public health concern and one of the leading causes of death in the United States (Heron, 2015). One population that has been found to exhibit significantly elevated rates of death by suicide is individuals with substance use disorders (SUDs; Pompili et al., 2009). For example, heroin users are 14 times more likely to die from suicide than their non-heroin using peers (Darke and Ross, 2002) and alcohol dependent individuals are estimated to have 60–120 times greater suicide risk than non-psychiatric populations (Sher, 2006). Thus, there is a need to identify factors that may increase risk for suicidal behavior within this population.

One factor that warrants investigation in this regard is anxiety sensitivity (AS). AS is a cognitive–emotional vulnerability factor reflecting the fear of anxious arousal. It is composed of three facets

relating to fears stemming from the perceived negative physical, social, and cognitive consequences of anxiety (Zinbarg et al., 1997). Although AS was originally conceptualized as a risk factor for anxiety disorders (Cox et al., 1999), AS has also been found to be elevated among individuals with substance use disorders (Stewart et al., 1997; Lejuez et al., 2006).

The cognitive facet of AS, AS cognitive concerns (ASCC), has specifically been identified as a risk factor for suicidal ideation (Schmidt et al., 2001; Capron et al., 2012a, 2012b). ASCC refer to exaggerated fears of going crazy or losing control of mental processes in the context of anxiety and stress. Research has shown that this particular facet of AS is independently associated with mood and trauma-related disorders (Olthuis et al., 2014), in contrast to the pattern of findings for overall AS or AS physical concerns, which generally demonstrate the strongest associations with panic disorder (Olatunji and Wolitzky-Taylor, 2009). ASCC are theorized to increase suicide risk by increasing distress related to depression symptoms that are commonly found in these mood and trauma-related disorders – a process referred to as the

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depression–distress amplification model (Capron et al., 2013b).

There is emerging support for the depression–distress amplification model in adults and adolescents. In a sample of clinical outpatients, findings revealed a significant relationship between ASCC and suicidal ideation above and beyond distress tolerance, gender, and depressive symptoms. Moreover, consistent with the depression–distress amplification model, depressive symptoms significantly moderated the relationship between ASCC and suicidal ideation (Capron et al., 2013b), with ASCC relating to suicidal ideation only among those with elevated depression symptoms. A recent study of a large sample of young adults with elevated risk of suicidal ideation (Beck Scale for Suicidal Ideation > 0) corroborated these findings. Specifically, not only were ASCC the only factor of AS to evidence a significant association with suicidal ideation in this sample, they were related to elevated suicidal ideation only among individuals high (vs. low) in depression (Capron et al., 2014). Finally, results of a recent longitudinal study of 524 eighth graders revealed that ASCC significantly predicted suicidal ideation two years later among youth with high (but not low) levels of current depression (Capron et al., 2015).

The current study represents the first examination of the depression–distress amplification model in a sample of male SUD patients. We chose to focus exclusively on men for several reasons, including (a) evidence that male SUD patients are at greater risk for completed suicide than female SUD patients (Conner et al., 2003); (b) the relative lack of research on suicidality in male versus female SUD populations (Ilgen et al., 2007); (c) differences in the symptom presentation of depression among men and women (Angst et al., 2002; Marcus et al., 2005); and (d) the well-documented gender differences in a variety of suicide-related risk factors in SUD patients, including psychiatric comorbidity, impulsivity, traumatic exposure, and substance use severity (Brady and Randall, 1999; Sonne et al., 2003; Zilberman et al., 2003; Lejuez et al., 2007). To begin to establish the unique relevance of the depression–distress amplification model of suicide risk within this population, we also explored whether this model relates to suicide risk above and beyond another well-established risk factor for suicide: insomnia symptoms (McCall et al., 2010; Nadorff et al., 2011). Indeed, one consideration that has not been addressed in the extant ASCC and suicide literature is the extent to which this relation may be accounted for by their shared associations with insomnia. As noted previously, ASCC have been found to evidence the strongest associations with mood and trauma-related disorders – disorders for which insomnia-type sleep disturbances are also key symptoms. Therefore, it is possible that the depression–distress amplification model is only a proxy for the more well-established relationship between insomnia and suicide.

The primary aim of the current study was to test the depression–distress amplification model of suicide risk within an at-risk clinical sample (i.e., patients in residential SUD treatment) by examining the interaction of ASCC and depression in relation to suicide risk, above and beyond another risk factor for suicide (i.e., insomnia) and relevant covariates. Based on the depression–distress amplification model, it was hypothesized that ASCC would interact with current major depressive episode (MDE) status to predict suicide risk (Capron et al., 2013b, 2014, 2015), above and beyond insomnia symptoms and other relevant covariates. Given the symptom overlap between insomnia and ASCC (e.g., racing thoughts, struggling to control thoughts), a secondary aim was to test an alternative model wherein MDE interacts with insomnia symptoms to predict suicide risk above and beyond ASCC and other relevant covariates. Given previously demonstrated support for the depression–distress amplification model (Capron et al., 2013b, 2014, 2015), we did not expect to find support for this alternative model.

## 2. Method

### 2.1. Participants

A sample of 111 adult male patients ( $M_{age}=34$ ,  $SD=10.47$ ) in a residential SUD treatment program participated in this study. Approximately half the sample self-identified as White (54%), with the other half identifying as Black/African-American (45%). One participant self-identified as Asian. In order to be included in the larger study, participants were required to be dependent on alcohol and/or cocaine, obtain a score of > 24 on a Mini-Mental Status Examination (Folstein et al., 1975), and report no current psychotic symptoms.

### 2.2. Measures

#### 2.2.1. Structured clinical interview for the DSM-IV for axis I disorders (SCID-I)

The research version of the SCID-I (SCID-I/NP; First et al., 2002) was used to assess current SUDs. The SCID-I has demonstrated good validity in SUD populations (Kranzler et al., 1996).

#### 2.2.2. MINI-international neuropsychiatric interview 6.0 (MINI)

The MINI (Sheehan et al., 1998) is a structured clinical interview that was used to assess current (non-SUD) psychiatric disorders (including current MDE) and suicide risk. To determine suicide risk, participants responded to 11 questions assessing suicidal ideation, plans, preparation, and attempt history. Suicide risk scores range from 0 to 52 and are used to classify individuals as having low (1–8), moderate (9–16), and high current suicidality ( $\geq 17$ ). The MINI has demonstrated high specificity for each evaluated disorder and excellent inter-rater reliability (Sheehan et al., 1998). The MINI suicidality total score has been previously used to measure suicide risk in clinical populations (Hearon et al., 2015). Interviews were conducted by bachelors- or masters-level clinical assessors trained to reliability with the principal investigator (MTT) and co-investigator (KLG). All interviews were reviewed by the principal investigator, with diagnoses and outcomes confirmed in consensus meetings.

#### 2.2.3. Anxiety sensitivity index-3 (ASI-3)

The ASI-3 (Taylor et al., 2007) is an 18-item questionnaire used to measure fears of anxiety symptoms due to perceived negative cognitive, physical, and/or social consequences. The ASI-3 has been found to have adequate convergent, discriminant, structural, and criterion-related validity (Taylor et al., 2007). Internal consistency of the cognitive subscale was excellent in the current study (Cronbach's  $\alpha=0.89$ ).

#### 2.2.4. Insomnia severity index (ISI)

The ISI (Bastien et al., 2001) is a 7-item self-report questionnaire that evaluates the nature, severity, and impact of insomnia. The ISI has demonstrated excellent internal consistency and good convergent validity with corresponding variables from sleep diaries (Bastien et al., 2001). Internal consistency was excellent in the present sample (Cronbach's  $\alpha=0.92$ ).

### 2.3. Procedure

All procedures were reviewed and approved by the relevant Institutional Review Boards. Eligible participants were recruited for this study no sooner than 72 h after entry in the facility (to limit the possible interference of withdrawal symptoms on study engagement). Prospective participants were provided with information about study procedures and associated risks, following which written informed consent was obtained. After providing informed consent, bachelors- or masters-level study personnel administered the diagnostic interviews and a questionnaire packet including the measures previously described. Participants were reimbursed \$25 for this assessment session.

## 3. Results

### 3.1. Preliminary analyses

Consistent with past research, the suicide risk variable was positively skewed and kurtotic (skewness=3.17; kurtosis=10.18). Following square-root transformation (as recommended for samples of this size; (Pallant, 2007; Tabachnick and Fidell, 2007), the suicide risk variable approximated a normal distribution (skewness and kurtosis < 2). However, it should be noted that the pattern of findings was the same when using the non-transformed MINI suicide risk variable.

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