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Emotion differentiation predicts likelihood of initial lapse following substance use treatment

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ABSTRACT

Background: An estimated 40% to 70% of individuals treated for a substance use disorder relapse within one year following treatment (Walitzer and Dearing, 2006). Relapse is often driven by the need to cope with intense negative affect (Koob, 2013). Emotion differentiation, defined as the ability to distinguish among various emotion states, has been linked to better behavioral control in the face of negative affect (Kashdan et al., 2015). The aim of the current study was to determine if higher levels of emotion differentiation are associated with the risk of experiencing an initial lapse following entry into residential substance use treatment.
Methods: A total of 213 substance users (69.5% male, 94.4% African American, M age = 43.01 ± 11.35 years) entering residential treatment were assessed on study variables at pre- and post-treatment, and at 1-, 3-, 6- and 12-month post-treatment. Emotion differentiation was calculated using ratings on five negative affect items derived from the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) at five assessment points.
Results: A Cox proportional-hazards regression model adjusting for age and negative affect intensity demonstrates that for every unit increase in emotion differentiation, there is a 27% reduction in the likelihood of initial lapse on any given day (OR = 0.73; 95% CIs [0.56, 0.95]).
Conclusions: The ability to differentiate among negative emotion states protects against initial lapse following treatment.

1. Introduction

A predominant motivational force thought to drive substance use is its negative reinforcement via the relief of negative affect (Baker et al., 2004; Koob, 2013). This is especially true when individuals cease prolonged use of a substance, and therefore experience heightened negative affect due to psychological withdrawal (Baker et al., 2004). Consequently, when faced with increased negative affect following abstinence, individuals resort to the prepotent coping technique (i.e., substance use). It follows that among individuals who are recently abstinent, those who are better able to cope with negative affect would be less likely to experience an initial lapse. Indeed, evidence suggests that individuals who are able to tolerate negative affect stay abstinent for longer periods of time (Daughters et al., 2005; Strong et al., 2012). However, the specific mechanisms contributing to one's ability to cope with negative affect remains undetermined.

Emotion differentiation may be one mechanism contributing to an individual's ability to cope with negative affect states (Barrett et al., 2001; Kashdan et al., 2015). Individuals who are high in emotion differentiation are able to distinguish among negative affect states and

represent their feelings using specific emotion adjectives (e.g., experience their negative affect as anger v. shame v. anxiety). Although previous research has linked constructs such as "emotional clarity" to drug use (Boden et al., 2013), emotion differentiation differs from emotional clarity in important ways. Whereas emotional clarity refers to an individual's self-reported meta-knowledge about their emotional experiences (e.g., Boden et al., 2012), emotion differentiation is typically represented by an *objective,* behavioral measure using repeated measurements of affect (e.g., Kashdan et al., 2014; Pond Jr et al., 2012). In such studies, individuals with high emotion differentiation have smaller correlations over time among negative affect states. In contrast, individuals who are low in emotion differentiation tend to exhibit higher correlations over time, leading to an undifferentiated and general experience of negative affect (e.g., experience their negative affect as just feeling bad). For such individuals, negative affect states are more highly correlated over time.

It is thought that emotion differentiation helps individuals cope with negative affect because individuals high in emotion differentiation perceive more nuanced information about the context of their emotional experience, and therefore engage in purposeful behavior directed

at regulating their negative affect (e.g., "I feel guilty, so I should apologize") (Barrett et al., 2001; Kashdan et al., 2015). On the other hand, individuals with lower emotion differentiation may be less able to regulate negative affect using adaptive strategies and thus feel more overwhelmed by it, leading them to use maladaptive behaviors to alleviate their affect (e.g., "I'm upset, so I need a drink").

Consistent with the idea that emotion differentiation helps individuals regulate negative affect and abstain from maladaptive substance use behaviors, evidence finds that underage social drinkers showing greater emotion differentiation among negative affect states are less likely to drink alcohol in response to negative affect (Kashdan et al., 2010). Differentiation of negative affect states is also protective against retaliating with aggression when feeling angry or engaging in non-suicidal self-injury when ruminating among individuals with borderline personality disorder (Zaki et al., 2013). Additionally, individuals with major depressive disorder (Demiralp et al., 2012) and social anxiety disorder (Kashdan and Farmer, 2014) have lower emotion differentiation ability compared to healthy controls.

Taken together, greater emotion differentiation appears to protect against maladaptive behaviors, including alcohol use. However, no study to date has examined whether this construct is associated with a greater likelihood of staying abstinent among treatment seeking substance users. Given that early abstinence from substance use is characterized by intensified negative affect and emotional vulnerability (e.g., Fox et al., 2007) emotion differentiation may prevent an individual from experiencing an initial lapse during this phase. Therefore, the current study aimed to examine whether greater emotion differentiation is associated with a lower probability of initial lapse following admission to substance use treatment.

2. Methods

2.1. Participants

Participants were current substance users, recruited upon admission from a 136-bed residential substance use treatment center in Northeast Washington, DC. Exclusion criteria for the study were < 5th grade English reading level, current psychotic symptoms, and initiation of psychotropic medication within the past three months.

Two additional exclusion criteria were used for the current study: (1) participants with less than three time points of valid affect data due to attrition ($n = 30$), and (2) participants who dropped out of the study prior to report of their initial lapse ($n = 13$). Participants with less than three time points of valid affect data were not included in analyses because having data at only one assessment point would lead to undefined correlations among affect items, and correlations for those with 2 assessment points would have to equal 1 or −1, regardless of an individual's true level of emotion differentiation. Individuals who dropped out of the study before their initial lapse were not included in the analyses because the statistical technique of survival analysis assumes that attrition is not related to the outcome measure of the study (Singer and Willett, 2003), yet studies indicate that attrition is positively related to substance use disorders (Graaf et al., 2000). The final sample included 213 participants.

2.2. Procedure

Potential participants participated in an intake interview within one week of admission, at which point they were assessed for eligibility and provided informed consent. All participants received treatment as usual (TAU), and were randomized to one of two additional treatment conditions, an experimental behavioral treatment or a contact time matched control condition (for detailed information regarding the parent trial and treatment conditions, see Daughters et al. (2017)). Participants from both conditions were combined for the following analyses, as treatment condition was not a variable of interest in this study. Study

assessments occurred pre-treatment, post-treatment (3 weeks following pre-treatment), and at 1-, 3-, 6-, and 12-month post treatment follow-ups. Study measures were administered at all study assessments, except for the momentary affect measure, which was not administered at the 1-month follow-up. Participants were compensated for their participation with gift cards for the pre- and post-treatment assessments, and with cash for the follow-up assessments. All study procedures were approved by the Institutional Review Board.

2.3. Measures

2.3.1. Potential covariates

Participants reported demographic information including race/ethnicity, gender, age, education, employment status and family/household income. Past year substance use diagnoses and current mood and anxiety diagnoses were determined using the substance use module of the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I; First and Gibbon, 2004). Past research has shown that negative affect intensity is associated with increased frequency of use and risk for relapse (e.g., Brandon et al., 2007; Kranzler et al., 2004). Negative affect intensity was therefore included as a covariate, which is in line with previous work examining emotion differentiation (e.g., Demiralp et al., 2012). Negative affect intensity, here on referred to as "affect intensity" was computed using ratings on five negative affect items (i.e., mad, frustrated, upset, embarrassed and nervous) derived from the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). The PANAS is a reliable and valid measure of current positive and negative affect (Crawford and Henry, 2004; Watson et al., 1988). The mode of response and scale were different from the original PANAS – participants rated the current intensity of negative affect using a visual rating scale, ranging from 0 (very slightly or not at all) to 100 (extremely). Internal consistency for the negative affect items in this study was strong (Cronbach's α ranging from 0.81 to 0.85). Affect intensity was computed as negative affect ratings averaged across the five items, and across the five assessment points, consistent with previous literature (Demiralp et al., 2012).

2.3.2. Emotion differentiation

Emotion differentiation was computed from ratings made to the five negative affect items stated above, which were derived from the PANAS (Watson et al., 1988). Emotion differentiation was represented by the average intraclass correlation with absolute agreement across the negative affect items (e.g., Kashdan et al., 2010; Shrout and Fleiss, 1979). This variable was computed using the "ICC" function in the psych package (Revelle, 2014) of the R statistical software (version 3.3.1) (Team, 2014). Some participants ($n = 30$, 11.7%) had ICC values for negative affect that were less than zero. Negative values are outside the theoretical range for an ICC, although such values are mathematically possible. When interpreting negative ICC values in the context of estimating inter-rater reliability, it is advised, "there is no other possible interpretation but poor agreement" across raters (Giraudeau, 1996, p.1). Therefore, in these cases, the value was recoded to equal zero, which is the theoretical lower limit for ICCs. Analyses were also conducted while excluding these participants, which did not change the results reported below. Consistent with previous research, Fisher's r to z transformation was conducted to fit this variable to a normal probability distribution. Further, to aid interpretation, this variable was recoded by multiplying it with −1 so that larger values would indicate high emotion differentiation (Kashdan et al., 2010).

2.3.3. Post treatment substance use

The Timeline Followback (TLFB; Sobell and Sobell, 1996) was used to assess the occurrence of any substance use following treatment entry. A trained interviewer asks the participants to recall daily substance use in reverse order, starting with the assessment date and ending on the date of the last assessment. This measure demonstrates high test-retest