



2015

# The Effects of Mindfulness on Affect and Substance Use

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## Recommended Citation

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# The Effects of Mindfulness on Affect and Substance Use

An Honors Thesis submitted in partial fulfillment of the requirements for Honors in Psychology.

By  
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Under the mentorship of Dr. Jessica Brooks, Ph.D.

## ABSTRACT

Previous studies have explored the impact of mindfulness on Big 5 personality traits, personality disorders, suicidal ideation, and alcohol use; additionally, mindfulness-based interventions (MBIs) have been used to treat individuals suffering from depression and anxiety. However, the practical application of mindfulness has been complicated by contradictory findings in the literature and inconsistent conceptualizations of the construct. The current study sought to investigate potential relationships between types of mindfulness, facets of mindfulness, substance use, and affect. Participants completed a battery of questionnaires related to mindfulness, correlates of neuroticism (i.e., depression, anxiety, and subjective happiness), and drinking-related consequences. Correlational analyses revealed significant relationships between mindfulness and neurotic subtraits (i.e., depression and anxiety), mindfulness and subjective happiness, and mindfulness and experiences of drinking-related problems. A regression revealed that the Acting with Awareness and Nonjudging facets of mindfulness significantly predicted recent experiences of drinking-related problems; as acting with awareness decreased and nonjudging increased, recent experiences of drinking-related problems increased. Results suggest that specific types and facets of mindfulness are differentially related to aspects of substance use behavior. Results also suggest a link between overall mindfulness and emotionality. The implications of this study for practical applications of mindfulness, as well as limitations and future directions, are discussed.

*Keywords:* mindfulness, affect, depression, anxiety, subjective happiness, drinking-related consequences

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Fall 2015  
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### The Effects of Mindfulness on Affect and Substance Use

Mindfulness is not an easily defined concept due to its derivation from Buddhist psychology, various adaptations in Western psychology and clinical practices, and the fact that it is still a relatively new focus in research (Bergomi, Tschacher, & Kupper, 2013a; Bishop et al., 2004; Brown, Ryan, & Creswell, 2007; Chiesa, 2013; Hart, Ivtzan, & Hart, 2013; Williams, Dalgleish, Karl, & Kuyken, 2014). However, most definitions of mindfulness have three features in common: (1) making oneself aware of one's current (present) thoughts as one participates in the experiences such thoughts arise from; (2) willingly paying attention to these thoughts without judging their value or connecting them to memories, emotions, and pre-existing ideas; and (3) accomplishing these goals through mental self-regulation and/or meditation (Baer, 2003; Bishop et al., 2004; Brown et al., 2007; Chiesa, 2013; Hart et al., 2013). Generally, what separates the definition of mindfulness in Western psychology from its traditional meaning is the focus on correctly responding to mental and physical problems in one's internal or external world, as opposed to participating in continuous moral improvement, and the addition of directives and exercises meant to assist clients in practicing mindfulness (Bishop et al., 2004; Brown et al., 2007; Chiesa, 2013).

#### **Conceptualizing Mindfulness**

Mindfulness in Western psychology has been studied as both a concept and in terms of its outcomes or applications (Bishop et al., 2004; Brown et al., 2007; Chiesa, 2013; Hart et al., 2013). One concept of mindfulness is *state* mindfulness, which refers to a person's level of mindfulness in a given moment; another is *trait/dispositional* mindfulness, which refers to a person's level of mindfulness as a function of their

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personality (Bishop et al., 2004; Brown et al., 2007; Chiesa, 2013; Hart et al., 2013; Thompson & Waltz, 2007). Trait/dispositional mindfulness has received more focus in the literature, perhaps due to a widespread perception that mindfulness is better understood as a trait than a state (Ciesla, Reilly, Dickson, Emanuel, & Updegraff, 2012). Mindfulness can also be divided into a focus on thoughts about the external world, the internal world, or both (Bishop et al., 2004; Chiesa, 2013; Hart et al., 2013).

Given the diversity of these categories, scales that measure mindfulness produce inconsistent results upon comparison, tend to be more or less sensitive to meditation experiences, and may measure completely different aspects of the construct altogether (Bergomi et al., 2013a; Brown et al., 2007; Chiesa, 2013; Karyadi, VanderVeen, & Cyders, 2014; Levin, Dalrymple, & Zimmerman, 2014; Thompson & Waltz, 2007). For example, the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R; Chiesa, 2013; Feldman et al., 2007; Hart et al., 2013), Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006; Baer et al., 2008; Brown et al., 2007; Chiesa, 2013; Hart et al., 2013), and the Friedburg Mindfulness Inventory (FMI; Brown et al., 2007; Chiesa, 2013; Hart et al., 2013) measure *trait/dispositional* mindfulness; the State Mindfulness Scale (SMS; Tanay & Bernstein, 2013) measures *state* mindfulness; and the Toronto Mindfulness Scale (TMS; Brown et al., 2007; Chiesa, 2013; Davis et al., 2009; Hart et al., 2013; Lau et al., 2006) and Mindful Attention Awareness Scale (MAAS; Brown et al., 2007; Chiesa, 2013; Hart et al., 2013) measure *both* trait and state aspects of mindfulness. The FFMQ, in particular, is often used with respondents who suffer from substance abuse problems (Williams et al., 2014).

### **Mindfulness and Substance Abuse**

Mindfulness-based interventions (MBIs) include Relapse Prevention, Acceptance and Commitment Therapy, Dialectical Behavioral Therapy, Mindfulness Based Cognitive Therapy, and the Mindfulness-Based Stress Reduction (MBSR) program (Baer, 2003; Brown et al., 2007; Chiesa, 2013). The literature has been overwhelmingly positive about these interventions. Mindfulness-based interventions have been successfully used to address unpleasant experiences in therapy, behavior regulation, interpersonal relationships, physical health conditions, mental health disorders, and substance abuse issues (Baer, 2003; Brown et al., 2007; Chiesa & Serretti, 2014; Fernandez, Wood, Stein, & Rossi, 2010).

Mindfulness interventions may work well because the thought processes behind substance abuse and mindfulness practices are incompatible (Garland, Gaylord, Boettiger, & Howard, 2010). For example, the abuse, misuse, and craving of alcohol is often triggered by stress, is exacerbated by a lack of effective coping strategies, and can be characterized by unawareness of, inattentiveness to, and biases towards alcohol cues; relapse is further characterized by thought suppression (Garland et al., 2010; Garland, et al., 2012). The concept of mindfulness, by contrast, emphasizes being aware of and paying attention to one's thoughts (Bishop et al., 2004).

Numerous studies have found that people who abuse substances show deficits in state and trait mindfulness. Levin et al. (2014) found that individuals who currently abused substances or had a history of substance abuse lacked certain facets of trait mindfulness. Also using the FFMQ, Fernandez et al. (2010) found that the '*Describing [of thoughts and feelings]*' and '*Acting with Awareness*' facets of mindfulness were

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negatively associated with excessive use of alcohol among college students, and suggested that practicing mindfulness would reduce substance abuse behaviors. Dakwar, Mariani, and Levin (2011) found similar results using a measure of state mindfulness (i.e., MAAS). These researchers also found that adult substance abusers had lower scores on measures of mindfulness than adults in a national sample, and that people who used multiple drugs scored lower on measures of mindfulness than people who only used one drug (Dakwar, Mariani, & Levin, 2011). Notably, Witkiewitz, Bowen, Douglas and Hsu's (2013) research and Chiesa and Serriti's meta-analysis (2014) suggest that the MBSR program and other MBIs are useful in reducing cravings for substances. However, despite the existing literature, there are still a number of unanswered questions about the relationship of mindfulness to substance use behaviors, particularly in relation to other variables such as personality traits.

### **Mindfulness and Neuroticism**

Current research has shown strong correlations, both negative and positive, between mindfulness, positive affect, negative affect, and Big Five personality characteristics that may affect substance use (e.g. conscientiousness and neuroticism) (Giluk, 2009; Latzman & Masuda, 2013; Thompson & Waltz, 2007), but the nature of these relationships remains unclear. Out of the Big Five personality traits, neuroticism has emerged as the most significant correlate to mindfulness, and subsequently has received the most attention in the literature (Giluk, 2009; Johns, Chavers, & Labbé, 2013).

Often considered synonymous with negative emotionality or negative affectivity, neuroticism is a stable, multi-faceted personality trait that encompasses worry, anxiety,

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sadness, etc. (Lahey, 2009; Barnhofer, Duggan, & Griffith, 2011; Yoon, Maltby, & Joormann, 2013; Zupančič & Kavčič, 2013). Previous studies have found that it is a significant predictor of depression, anxiety disorders, substance use disorders, and subjective well-being (SWB) (Weiss, Bates & Luciano, 2008; Lahey, 2009; Yoon et al., 2013). People who exhibit high levels of neuroticism tend to use maladaptive emotional regulation strategies—such as rumination (i.e., obsessively thinking about and attaching meaning to negative emotions), thought suppression (i.e., attempting to not think about stressful situations, which can intensify anxiety), or expressive suppression (i.e., attempting to constrain a physical show of emotion)—as well as maladaptive coping strategies (e.g., abusing substances) to deal with disorders like depression (Lahey, 2009; Yoon et al., 2013). By contrast, mindfulness, with its emphasis on focusing on the present moment and nonjudgment of experiences, is incompatible with the aforementioned strategies and neuroticism more generally (Chiesa, Serretti, & Anselmi, 2014; Giluk, 2009; Feltman, Robinson, & Ode, 2009).

**Correlates of Neuroticism.** Most studies concerning mindfulness and neuroticism have examined how trait/dispositional mindfulness either mediates or moderates relationships between neuroticism and associated outcomes (e.g. depression, anxiety, anger, and subjective well-being) (Feltman et al., 2009; Barnhofer et al., 2011; Lee & Bowen, 2014; Pearson, Lawless, Brown, & Bravo, 2015; Wenzel, von Versen, Hirschmüller, & Kubiak, 2015). In addition, several meta-analyses have found that MBIs, particularly MBSR, effectively reduce anxiety and depression (Hofmann, Sawyer, Witt, & Oh, 2010; Keng, Smoski, & Robins, 2011; Khoury, Sharma, Rush, & Fournier, 2015).

Feltman, Robinson, and Ode (2009) found that neuroticism was a significant

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negative predictor of dispositional mindfulness and, even when the “overlap of neuroticism and mindfulness [was] controlled [for]” (p. 957) dispositional mindfulness was a significant negative predictor of depressive symptoms. In other words, people with high levels of neuroticism and low levels of mindfulness displayed significantly more depressive symptoms than people high in mindfulness or low in both mindfulness and neuroticism. Barnhofer, Duggan, and Griffith (2011) expanded upon Feltman et al.’s results by measuring symptoms of depression in a sample assessed for neuroticism six years prior. These researchers found that, even with the measures being administered at different points in time, mindfulness moderated the relationship between neuroticism and depressive symptoms; that is, the neuroticism-depression relationship was significantly weaker for people with high levels of dispositional mindfulness (Barnhofer, Duggan, & Griffith, 2011).

The usefulness of mindfulness in a clinical setting is better demonstrated by the results of studies that examine the impact of MBIs on different outcomes. Much of the literature in this regard has not only concerned depression, but also anxiety. Serpa, Taylor, and Tillisch (2014) conducted a longitudinal study with veterans, in which participants in a 9-week MBSR training program reported increased mindfulness and significant reductions in suicidal ideation, depression, and anxiety upon completing the program. The researchers found that mindfulness mediated “changes in depression, anxiety, and general mental health functionality” (p. S22). Notably, while the sample included veterans who suffered from a broad range of disorders, some of these veterans had been previously diagnosed with substance use disorders (Serpa et al., 2014). Similar reductions in anxiety following MBSR training have been demonstrated in populations of



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graduate healthcare students (Barbosa et al., 2015), Korean nursing students (Song & Lindquist, 2015), women with heart disease (Tacón, McComb, Caldera, & Randolph, 2002), and patients with generalized and/or social anxiety disorders (Vøllestad, Sivertson, & Nielsen, 2011). Song and Lindquist (2015), Tacón et al. (2002), and Vøllestad et al. (2011) also found significant reductions in depression.

Subjective well-being—a correlate of neuroticism that encompasses constructs like mood, happiness, life satisfaction, positive affect, and negative affect (Weiss et al., 2008; Yilmaz & Arslan, 2013)—has also been linked to mindfulness. Neuroticism and SWB have an inverse relationship; as levels of neuroticism go up, SWB goes down (Weiss, Bates, & Luciano, 2008; Wenzel, von Versen, Hirschmüller, & Kubiak, 2015). By contrast, as levels of dispositional mindfulness go up, SWB does too (Harrington, Loffredo, & Perz, 2014). That said, in one of the few studies where both trait and state (termed “daily” therein) mindfulness are measured, Wenzel et al. (2015) found that both categories of mindfulness mediate the relationship between neuroticism and SWB; specifically, even individuals who are highly neurotic and low in trait mindfulness show improvements in daily mood when their state mindfulness increases.

These results are of particular interest for the current study, in which levels of mindfulness are hypothesized to correlate with negative affect, as measured by the neurotic subtraits of anxiety and depression, and positive affect, as measured by subjective happiness. However, it is important to note that neuroticism is not the only personality trait that is strongly associated with mindfulness. In fact, mindfulness shares several important commonalities with conscientiousness (hallmarks of which include thoroughness, efficiency, and achievement/task orientation); both are negatively

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correlated to neuroticism, positively correlated to self-esteem and SWB, predictors of effective coping strategies, and focused on mental self-regulation (Giluk, 2009; Soto, 2015; Watson & Hubbard, 1996). As Giluk (2009) points out, the lack of focus on the relationship between these constructs is perplexing, particularly as mindfulness research expands to the workplace, where conscientiousness has a strong predictive value in measuring outcomes. Unfortunately, measuring conscientiousness is beyond the scope of the present study and remains a variable of interest in future studies.

### **The Purpose of the Present Study**

The purpose of the present study is to explore the possible connections between types of mindfulness, facets of mindfulness, the use of substances and negative consequences thereof, and mental health correlates of neuroticism (i.e., anxiety, depression, and subjective happiness) by answering the following questions:

1. To what extent is dispositional (trait) mindfulness related to substance use in a population of college students?
2. To what extent is the capacity or willingness to be mindful linked to personality subtraits—specifically anxiety, depression, and subjective happiness—in a population of college students?
3. To what extent are facets of mindfulness predictive of recent substance use behaviors in a population of college students?

Given that college students may vary in their experience with meditation, other mindfulness practices, and mindfulness-based interventions, participants completed *state* and *trait* versions of the TMS, the CAMS-R to measure capacity or willingness to be mindful, and the comprehensive FFMQ to measure facets of mindfulness. Participants

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also completed measures related to substance use behaviors (particularly drinking) and personality (i.e., affective correlates of neuroticism).

Hypothesis 1: A negative relationship between dispositional (trait) mindfulness and recent substance use problems will be established.

Hypothesis 2: High levels of mindfulness (i.e., higher capacity or willingness to be mindful) will correlate positively with positive affect (i.e., subjective happiness) and negatively to negative affect (i.e., neurotic subtraits of anxiety and depression).

Hypothesis 3: Low levels of mindfulness (i.e., lower capacity or willingness to be mindful) will correlate positively to negative affect (i.e., neurotic subtraits of anxiety and depression), and negatively with positive affect (i.e., subjective happiness).

Hypothesis 4: Facets of mindfulness will be predictive of recent substance use behaviors (i.e., experience with negative consequences of drinking within the last 3 months).

Data collection for this project began in the spring semester of 2015 following IRB approval and ended in the fall of 2015. The project did not require funding and no participants dropped out of the study as a result of undue stress caused by participation.

## Method

### Participants

Two hundred and three undergraduates (male:  $n = 64$ , 31.50%; female:  $n = 68.50%$ ;  $M_{\text{age}} = 19.10$  years;  $SD_{\text{age}} = 1.29$ ; age range: 18 – 26 years) from a southeastern university participated in this study as partial completion of a course requirement or to obtain extra credit. All individuals interested in participating in this study were allowed to, with the exception of those who were not 18 years of age. Participants were recruited through the Psychology Department's SONA system. Self-reported race/ethnicity was as follows: White/Caucasian ( $n = 123$ , 60.60%), Black/African American ( $n = 61$ , 30.00%), Hispanic/Latino ( $n = 4$ , 2.00%), Asian/Asian American ( $n = 1$ , 0.50%), Pacific Islander/Native Hawaiian ( $n = 1$ , 0.50%), biracial ( $n = 4$ , 2.00%), and multiracial ( $n = 9$ , 4.40%). Self-reported sexual orientation of participants was heterosexual ( $n = 180$ , 88.70%), lesbian ( $n = 1$ , 0.50%), bisexual ( $n = 14$ , 6.90%), asexual ( $n = 6$ , 3.00%), and other ( $n = 2$ , 1.00%). A majority of participants reported current alcohol use ( $n = 113$ , 55.70%), followed by past alcohol use but not within the last 3 months ( $n = 55$ , 27.10%), and no alcohol use in lifetime ( $n = 35$ , 17.20%).

### Design

This was an exploratory study with a correlational design; it investigated mindfulness in relation to recent experiences (or lack thereof) with substance use problems (i.e., negative consequences of drinking), negative affect (i.e., subtraits of neuroticism), and positive affect (i.e., subjective happiness). Participants completed self-report questionnaires on all of these constructs. There was no experimental manipulation

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or placement of participants into groups based on a specific set of criteria. All measures were presented in random order to prevent potential ordering effects.

### Measures

**Demographics Questionnaire.** The demographics questionnaire was administered to all participants and provided a better understanding of the study sample. The questionnaire included the following information: age, race/ethnicity, sexual orientation, gender identity, and alcohol use to measure past or continuous experience (or a lack thereof) with drinking.

**Mindfulness.** Three self-report measures were used to measure mindfulness. The constructs of trait and state mindfulness were assessed using two versions of the Toronto Mindfulness Scale (TMS; Davis et al., 2009; Lau et al., 2006). Each version of the TMS has 13 positively keyed items and consists of two factors: Curiosity and Decentering (Davis et al., 2009; Lau et al., 2006). Higher scores on the trait version of the TMS (TMS-T; Davis et al., 2009) indicate a higher tendency to be mindful; higher scores on the state version of the TMS (TMS-S; Lau et al., 2006) indicate higher mindfulness in the moment. For both measures, participants were asked to respond on a 5 point Likert-type scale, with 0 representing “Not at all” and 4 representing “Very much.”

In previous studies—and on both versions of the TMS—the Curiosity and Decentering factors have exhibited acceptable to good internal reliability: Trait Curiosity (e.g., “I am curious to see what my mind is up to from moment to moment”) ( $\alpha = .91$ ), Trait Decentering (e.g. “I am aware of my thoughts and feelings without overidentifying with them”) ( $\alpha = .85$ ), State Curiosity (e.g. “I was curious to see what my mind was up to from moment to moment”) ( $\alpha = .88$ ), and State Decentering (e.g. “I was aware of my

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thoughts and feelings without overidentifying with them”) ( $\alpha = .84$ ) (Davis et al., 2009; Lau et al., 2006). In this study, Cronbach’s alphas were comparable to those of previous studies, with each factor exhibiting acceptable internal reliability: Trait Curiosity ( $\alpha = .92$ ), Trait Decentering ( $\alpha = .86$ ), State Curiosity ( $\alpha = .88$ ), and State Decentering ( $\alpha = .77$ ).

The general level of mindfulness was assessed using the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R; Feldman et al., 2007), an inventory that consists of 10 items (one reverse scored). This questionnaire is used to measure the magnitude of an individual’s “mindful qualities” (p. 182) with higher scores reflecting higher overall mindfulness (i.e., a higher capacity or willingness to be mindful) (Feldman et al., 2007). Sample items include “I am able to accept the thoughts and feelings I have” and “It is easy for me to concentrate on what I am doing” (Feldman et al., 2007). Participants were asked to respond on a 4 point Likert-type scale, with 1 representing “Rarely/Not at All” and 4 representing “Almost Always.” In previous studies the CAMS-R has demonstrated sufficient internal reliability with both student samples ( $\alpha = .81$ ) and adult community samples ( $\alpha = .85$ ) (Feldman et al., 2007). In the current study, the CAMS-R exhibited low internal reliability ( $\alpha = .54$ ), thus analyses using this scale are to be interpreted with caution.

Facets or “skills” of mindfulness were assessed with the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006; Baer et al., 2008), which consists of 39 items and five subscales, including Nonreactivity, Observing, Acting with Awareness, Describing, and Nonjudging. Participants were asked to respond on a 5 point Likert-type scale, with 1 representing “never or very rarely true” and 5 representing “very often or

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always true” (Baer et al., 2006). All items on the Acting with Awareness and Nonjudging subscales, as well as three items on the Describing subscale, were reverse scored (Baer et al., 2006). Higher scores on a subscale indicate a stronger presence of the corresponding mindfulness skill (Baer et al., 2006).

The five subscales have demonstrated acceptable internal reliability in previous studies: Nonreactivity (e.g., “In difficult situations, I can pause without immediately reacting”) ( $\alpha = .75$ ), Observing (e.g., “I notice how foods and drinks affect my thoughts, bodily sensations, and emotions”) ( $\alpha = .83$ ), Acting with Awareness (e.g., “I find myself doing things without paying attention”) ( $\alpha = .87$ ), Describing (e.g., “It’s hard for me to find the words to describe what I’m thinking”) ( $\alpha = .91$ ), and Nonjudging (e.g., “I tell myself that I shouldn’t be thinking the way I’m thinking”) ( $\alpha = .87$ ) (Baer et al., 2006).

The subscales of the FFMQ exhibited acceptable internal reliability in this study (Nonreactivity:  $\alpha = .77$ ; Observing:  $\alpha = .79$ ; Acting with Awareness:  $\alpha = .91$ ; Describing:  $\alpha = .85$ ; Nonjudging:  $\alpha = .90$ ).

**Substance Use Problems.** Recent substance use problems were assessed with the 50-item Drinker Inventory of Consequences-Recent (DrInC-2R; Miller, Tonigan, & Longabaugh, 1995). The DrInC-R is a modified version of The Drinker Inventory of Consequences-Lifetime (DrInC-2L; Miller et al., 1995), and assesses recent experiences of negative, drinking-related consequences. Notably, this scale is capable of measuring drinking-related problems in terms of five subscales, but in the present study only total scores are used. Five of the items are negatively keyed items to prevent response bias. Sample items include “My drinking has caused me to use other drugs more” and “While drinking or using drugs, I have said harsh or cruel things to someone” (Miller et al.,

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1995). Participants responded to items depending on how often they had experienced drinking or drug-related problems within the last 3 months (Miller et al., 1995).

Experiences were rated using a 4 point Likert-type scale, with 0 representing “Never” and 3 representing “Daily or almost daily” (Miller et al., 1995). In previous studies, the internal reliability of the DrInC-2R has ranged from good to excellent ( $\alpha = .85 - .98$ ; Tartter & Ray, 2012). In the current study, internal reliability of the DrInC-2R was also good ( $\alpha = .82$ ).

**Affect.** Positive and negative affect (i.e., emotions) were assessed with two self-report questionnaires. Positive affect was measured using the Subjective Happiness Scale, which has 4 items (one negatively keyed) (SHS; Lyumbomirsky & Lepper, 1999).

Participants responded to items depending upon how they would complete or answer the presented statements and questions (e.g., “Some people are generally very happy. They enjoy life regardless of what is going on, getting the most out of everything. To what extent does this characterization describe you?”) (Lyumbomirsky & Lepper, 1999). The response format was a 7 point Likert-type scale, with 1 representing “not a very happy person,” “less happy,” or “not at all,” and 7 representing “a very happy person,” “more happy,” or “a great deal.” Internal reliability for the SHS in previous studies has ranged from acceptable to excellent ( $\alpha = .79 - .94$ ; Lyumbomirsky & Lepper, 1999). In the current study, internal reliability of the SHS was acceptable ( $\alpha = .77$ ).

Negative affect, as it pertains to the neurotic subtraits of depression and anxiety, was measured using a modified, 20-item version of the Depression and Anxiety Stress Scales (DASS-21; Antony et al., 1998; Lovibond & Lovibond, 1995). The DASS-42 and DASS-21 assess negative emotionality, specifically depression, anxiety, and stress, and



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consist of three corresponding subscales: DASS-D, DASS-A, and DASS-S (Antony et al., 1998; Lovibond & Lovibond, 1995). In the current study, one depression item related to feelings of meaninglessness in life was removed. Participants were asked to respond on a 4 point Likert-type scale, with 0 representing “Did not apply to me at all” and 3 representing “Applied to me very much, or most of the time” (Lovibond & Lovibond, 1995). All items are positively keyed, such that higher scores indicate a higher incidence of symptoms associated with depression, anxiety, or stress (Antony et al., 1998; Lovibond & Lovibond, 1995).

The three subscales of the DASS-21 have exhibited good or excellent internal reliability in previous studies: DASS-S ( $\alpha = .91$ ), DASS-D ( $\alpha = .94$ ), and DASS-A ( $\alpha = .87$ ) (Antony et al., 1998). Two of these subscales were used in the current study and each demonstrated acceptable internal reliability: DASS-A ( $\alpha = .79$ ) and DASS-D ( $\alpha = .83$ ).

### **Procedure**

This study was administered in a psychology laboratory on a university campus. Upon arrival, each participant was instructed to take a seat at one of three computer stations and read over an informed consent statement. After the informed consents were completed and returned, participants received standardized instructions to work individually for the duration of a single 60 to 75 minute session. Each participant completed a battery of questionnaires, including the TMS-T (Davis et al., 2009), TMS-S (Lau et al., 2006), CAMS-R (Feldman et al., 2007), FFMQ (Baer et al., 2006), DrInC-2R (Miller et al., 1995), SHS (Lyumbomirsky & Lepper, 1999), modified DASS-21 (Antony et al., 1998; Lovibond & Lovibond, 1995), and the demographics questionnaire. The questionnaire portion of the study was administered using the computer program

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MediaLab v2012, and on PCs with Windows 7 operating systems. All measures were presented in random order to prevent potential ordering effects. At the conclusion of the study, participants were debriefed in a separate room, thanked for their participation, and awarded credit for their participation.

## Results

### The Relationship between Mindfulness and Affect

In this sample ( $N = 203$ ), mindfulness scores ranged from 17 – 34, with possible scores ranging from 10 to 40 ( $M = 25.63$ ,  $SD = 3.75$ ). The mean score for anxiety in this sample was  $M = 8.72$  ( $SD = 7.09$ ), with possible scores ranging from 0 to 21. The mean score for depression in this sample was  $M = 6.85$  ( $SD = 6.36$ ), with possible scores ranging from 0 to 18. The mean score for subjective happiness in this sample was  $M = 19.29$ , with possible scores ranging from 4 to 28.

Participants were divided into high and low mindfulness groups based on a median split of CAMS-R scores. The median score on the CAMS-R was 26, therefore those scoring 25 and below were designated to the ‘low mindfulness group’ ( $N = 99$ ), while those who scored 27 and above were designated to the high mindfulness group ( $N = 87$ ). To ensure adequate separation between groups, those who scored 26 ( $N = 17$ ) were removed from the remainder of this portion of analysis. Pearson correlations were calculated to assess the direction of relationships between levels of mindfulness (CAMS-R) and anxiety (DASS-A), depression (DASS-D), and subjective happiness (SHS) (see Table 1).

Table 1

*Correlations (Pearson’s  $r$ ) between Levels of Mindfulness and Measures of Affect*

Variable	Anxiety	Depression	Subjective Happiness
High Mindfulness	–0.27**	–0.28**	0.34**
Low Mindfulness	0.31**	0.30**	–0.33**

*Note.* All correlations are two-tailed.

\*\*  $p < .01$ .

### **Predicting Drinking-Related Problems**

To estimate the proportion of variance in the recent experience of drinking-related problems (DrInC-2R) that can be accounted for by facets of mindfulness (FFMQ), a standard multiple regression analysis (MRA) was performed.

Prior to interpreting the results of the MRA, assumptions of normality and collinearity were evaluated and met. Mahalanobis distance did not exceed the critical  $\chi^2$  value for  $df = 5$  (at  $\alpha = .001$ ) of 20.52 for any cases in the data file, indicating that multivariate outliers were not of concern. Relatively high tolerances for all predictors in the regression model indicated that multicollinearity would not interfere with our ability to interpret the outcome of the MRA.

In combination, facets of mindfulness accounted for a significant 9.3% of the variability in recent experience of drinking-related problems,  $R^2 = .093$ , adjusted  $R^2 = .070$ ,  $F(5, 197) = 4.03$ ,  $p = .002$ . The effect size of this model is small ( $d = 0.1$ ). FFMQ Acting with Awareness and Nonjudging were unique predictors of drinking-related problems in the last 3 months. FFMQ Acting with Awareness was a negative predictor of problems. As acting with awareness decreased, drinking-related problems increased. FFMQ Nonjudging was a positive predictor of drinking-related problems in the last 3 months. As nonjudging increased, drinking-related problems increased. Unstandardized ( $B$ ) and standardized ( $\beta$ ) regression coefficients for each predictor in the regression model are reported in Table 2.

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Table 2

*Unstandardized (B) and Standardized ( $\beta$ ) Regression Coefficients for Each Predictor in a Regression Model Predicting Recent Experience of Drinking-Related Problems*

Variable	B [95% CI]	$\beta$
Nonreactivity	0.00	0.00
Observing	0.08	0.14
Acting with Awareness	-0.16	-0.32**
Describing	-0.02	-0.04
Nonjudging	0.09	0.18*

*Note.*  $N = 203$ . CI = Confidence Interval.

\* $p < .05$ . \*\* $p < .01$ .

## Discussion

Mindfulness is a burgeoning research area with a wide variety of applications, but the diversity with which it can be defined and measured has often led to inconsistent or contradictory findings. Therefore, instead of choosing a single measure to represent the construct, the current study sought to explore multiple types and facets of mindfulness as they relate to emotions and substance use.

The TMS-T was our chief measure of trait/dispositional mindfulness, but only one of its factors—Trait Curiosity—was significantly related to drinking-related problems, and this relationship was not in the hypothesized, negative direction. While this finding contradicts other studies that have found an inverse relationship between dispositional mindfulness and substance misuse (Fernandez et al., 2010; Garland et al., 2010; Garland et al., 2012; Levin et al., 2014), it is not wholly unexpected. Kasdan et al. (2011) found that people who are high in both curiosity and mindfulness are less guarded in the face of threats to their worldviews; a similar process could have been at work here.

Heightened mindful curiosity may decrease inhibitions and counteract judgment, simultaneously making the misuse of substances more attractive and less threatening. Additionally, previous studies have used the FFMQ and its individual facets to study dispositional mindfulness, not the TMS-T (Fernandez et al., 2010; Levin et al., 2014).

As hypothesized, FFMQ facets of mindfulness significantly predicted recent drinking-related problems. Specifically, the current study found that FFMQ Acting with Awareness was a significant negative predictor of recent experiences with drinking-related problems—a finding consistent with that of past research (Fernandez et al., 2010; Karyadi et al., 2014; Levin et al., 2014). However, we also found that FFMQ Nonjudging

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was a significant positive predictor of recent drinking-related problems, whereas in previous studies it has been a consistent, negative predictor of substance abuse (Fernandez et al., 2010; Karyadi et al., 2014; Levin et al., 2014). Also, individuals who are high in some facets of mindfulness may lack in others (Levin et al., 2014). There is a possibility that some of the people who are high in Nonjudging have deficits in other facets, such as Acting with Awareness; to that end, some facets of mindfulness may only be effective when paired with others.

The current study also investigated the relationship between overall mindfulness and positive affect (as measured by subjective happiness, a negative correlate of neuroticism) and negative affect (as measured by two neurotic subtraits—depression and anxiety). As predicted, individuals high in mindfulness reported significantly higher feelings of subjective happiness, and significantly lower feelings of depression and anxiety, than individuals low in mindfulness. Also as predicted, individuals low in mindfulness reported significantly higher feelings of depression and anxiety, and significantly lower feelings of subjective happiness, than their high in mindfulness counterparts. These findings are consistent with previous research, which has found that mindfulness is inversely related to negative affect, neuroticism, depression, and anxiety, but positively related to subjective well-being and happiness (Feltman et al., 2009; Barnhofer et al., 2011; Lee & Bowen, 2014; Pearson, Lawless, Brown, & Bravo, 2015; Wenzel, von Versen, Hirschmüller, & Kubiak, 2015).

### **Limitations**

This study has a number of limitations. Several of our important analyses depended upon the CAMS-R, a measure that had poor internal reliability in this study, and therefore a replication would be beneficial to ensure accuracy of the current findings. Additionally, measures of personality were limited to neuroticism and correlates of neuroticism, which does not increase our understanding of how mindfulness interacts with other personality traits and substance use more broadly.

### **Future Directions**

While measuring the relationship of conscientiousness to different types and facets of mindfulness was beyond the scope of this study, it would be beneficial to incorporate the construct into future research. Conscientiousness has exhibited many similarities to mindfulness, and has demonstrated significant predictive value in determining outcomes in the workplace, a setting where mindfulness practices are increasingly introduced (Giluk, 2009). That being said, future research should examine whether disparate types and facets of mindfulness are differentially related to conscientiousness, as they are to correlates of neuroticism and substance use.

This study has raised some new questions, and justified the pursuit of some old ones, in regard to mindfulness and substance use. Acting with Awareness, whether it is one of a group of significant facets or the only significant facet, has consistently shown a negative effect on substance use, such that substance use behaviors are reduced, in the literature on mindfulness. Nonjudging, on the other hand, seems to demonstrate more of the expected, negative effect on substance use when in concert with several other facets. For example, in their meta-analysis on trait mindfulness and substance use, Karyadi et al.



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(2014) found that Acting with Awareness, Nonjudging, *and* Nonreactivity were the most significant, negative, and co-occurring predictors of substance use. Future research should consider the impact of different *combinations* of facets (e.g., Acting with Awareness, Nonjudging, and Nonreactivity) on substance use behaviors. Finally, future research should continue to examine the consistencies and inconsistencies between different mindfulness scales when used with the same samples, and determine what they tell us about the intricacies of destructive behavior.

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