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Testing Individual Differences in Negative Affect Related to Smoking: The Role of Emotional Clarity

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Testing Individual Differences in Negative Affect Related to Smoking:
The Role of Emotional Clarity

By

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A thesis submitted in partial fulfillment
of the requirements for the degree of
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Dedication

I want to dedicate this thesis to my friends and family for their continuous encouragement and unconditional support.

Acknowledgments

I would like to thank my friends and family for their unconditional support. In particular, I want to thank my advisor for supporting my creativity and encouraging me to take risks. I also want to thank my thesis committee members, Dr. Jonathan Rottenberg and Dr. Joseph Vandello for their valuable advice and support. Most importantly, I want to thank my fellow graduate students, in particular Bryan Heckman, for their support, guidance, and mentorship. Also, this thesis would not have happened without the help of my research assistants, Stephanie Sivils, Cayleen Hanshaw, Brittany Anderson, Catherine Lim, Marian Osimen, and Mannette Joseph. I am sincerely thankful for their assistance and willingness to help.

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Abstract

Negative affect plays a critical role in nicotine dependence. Smokers report feeling that negative affect is a primary motivation to keep smoking. This study examined the relationship between individual differences in emotional experience, in particular emotional clarity and differentiation (individuals' ability to understand, describe, and differentiate between emotions), and smoking motivation. We hypothesized that emotional clarity would be related to affect, craving, and smoking satisfaction. A second goal was to test the ability of an emotional-labeling intervention to reduce negative affect and smoking motivation resulting from a negative emotion induction. We also tested whether emotional clarity moderated the effect of the negative affect manipulation upon smoking-related variables. We hypothesized that emotional clarity would moderate the effect of the emotional-labeling manipulation upon affect, craving, and smoking satisfaction. A correlational and two-group between-subjects design was used. Participants (170 participants; 86 males) first completed baseline measures, then received a mood induction (via video). They then were randomized to one of two conditions (emotion labeling and writing control). Results indicate that emotional clarity was related to affect, craving, and smoking satisfaction ratings, such as those higher on emotional clarity reported more positive affect, less cravings, and having experienced aversive effects after smoking. We found no effect of the emotional labeling task. Although we replicated findings from previous studies showing a relationship between emotional clarity and mood, this study is the first to establish such a relationship with craving for a cigarette and aspects of smoking satisfaction.

Testing Individual Differences in Negative Affect Related to Smoking:

The Role of Emotional Clarity

Smoking remains the leading cause of disease and preventable death in the U.S., causing approximately 440,000 deaths each year and costing approximately \$157 billion in annual health-related economic losses (CDC, 2009). It is still the leading cause of multiple types of cancer, cardiovascular disease, respiratory diseases, reproductive defects and organ damage. Although the negative consequences of smoking are evident, approximately 46 million adults in the U.S. continue smoking (CDC, 2010).

Research on tobacco use has examined what motivates smokers to continue smoking despite the obvious negative consequences of tobacco use. Negative affect is among the most reported motivations to smoke and relapse among smokers. There is evidence suggesting that negative affect and cigarette smoking are indeed related (Brandon, 1994). However, rarely has the literature on negative affect and smoking examined the role of individual difference variables in emotional experience among smokers. One such variable is the degree to which individuals are able to understand, label, and identify their emotions—referred to as emotional clarity or differentiation (Salovey et al., 1995). Differences in emotional experience appear to have ramifications for emotional regulation. The present paper will discuss the relationship between negative affect and cigarette smoking, as well as the evidence regarding emotional clarity and differentiation among non-clinical and substance use samples. Furthermore, this paper aims to present evidence supporting the potential of emotional labeling as a strategy to overcome the deficits that stem from poor emotional clarity and differentiation. Overall, the current study aims to examine individual differences in how smokers experience negative emotions, and how these differences may influence smoking behavior.

Negative Affect and Tobacco Use

The fact that many individuals continue to smoke despite the obvious negative consequences of cigarette smoking has led researchers to examine smoker's motivations to continue smoking. Negative affect has been identified by smokers to be an important motivator to smoke (Kassel, Stoud, Paronis, 2003). Similarly, many smokers hold the expectancy that smoking will reduce stress and negative affect (Brandon & Baker, 1991; Copeland, Brandon, & Quinn, 1995).

Not only has negative affect been shown to be an important component of motivation to smoke, but it has also been found to be related to cessation outcome and relapse (Borelli et al., 1996; Cinciripini et al., 2003; Kenford et al., 2002). Evidence for the relationship between negative affect and cigarette smoking appears to be compelling. Researchers have also examined whether cigarette smoking actually reduces negative affect. Laboratory findings show mixed results. Although some studies have found that cigarettes smoking in fact reduces negative affect (Jarvik, Caskey, Rose, Herskovic, & Sadghpour, 1989; Perkins & Grobe, 1992), others have failed to find this association (Kassel & Unrod, 2000).

The mechanisms underlying the association between negative affect and cigarette smoking are unknown, although there are some theories. Baker et al. (2004) argued that at early stages of nicotine dependence, smokers become aware of interoceptive changes that result from withdrawal. They also noted that these interoceptive changes may occur outside of awareness and may signal negative affect. Dependent smokers will then smoke to relieve or prevent symptoms of nicotine withdrawal, including the negative affect that accompanies withdrawal. Given the reinforcing nature of this behavior and the repeated pairings between cigarette smoking and withdrawal-related negative affect, smokers generalize this association to negative affect not necessarily related to withdrawal. It is important to note that this mechanism might occur at a preconscious level, which underscores the possible importance of emotional awareness and experience.

Research on negative affect in the context of nicotine addiction has focused mainly on core affect and its valence. Less emphasis has been placed on the experience of discrete

negative emotions, such as anger, sadness, and frustration, and the role they play among smokers. Examining the experience of discrete negative emotions with respect to emotional clarity and differentiation could open a door into understanding not only the valence of the emotions smokers feel (pleasant vs. unpleasant), but also *how* they experience those emotions. Previous research has found that emotional clarity and differentiation is adaptive (e. g., Izard & Ackerman, 2000), whereas deficits in emotional clarity and differentiation could lead to failure in emotion regulation.

Emotion Differentiation and Clarity

Emotions might not inherently fit into categories; however, categorizing emotions can serve an adaptive function (Izard & Ackerman, 2000). Discrete emotions, such as sadness, fear, and happiness, are unique experiential states (Izard, 1977), and as such, they contain particular information about what caused them (Schwarz & Clore, 1983), how to behave in their presence and what to do to regulate them (Feldman-Barrett et al., 2001). There is evidence suggesting that there are individual differences in how people experience emotions. Some individuals experience emotions in a discrete fashion, whereas others experience emotions in a more global manner (Feldman-Barrett et al., 2001). Those individuals who experience emotion in a differentiated manner are said to be clearer about the emotions they experience (Feldman-Barrett et al., 2001). Individuals who are able to differentiate emotions show low correlations between emotions of the same valence over time (anger, fear, sadness, frustration). On the other hand, individuals who experience emotion in a global fashion show large positive correlations between similar emotions, and rely on their pleasantness (good) or unpleasantness (bad) to describe them (Feldman-Barrett et al., 2001).

In the literature, some researchers use the terms emotion differentiation and emotional clarity interchangeably (e.g., Feldman-Barrett et al., 2001; Salovey et al., 1995). However, others argue that emotion differentiation and emotion clarity refer to two different structural representations of emotional experience such that experiencing emotion in a discrete or global way does not mean that individuals do not experience emotions clearly (Lischetzke et al., 2005). Nevertheless, the definitions of emotion clarity and emotion differentiation appear to tap into

similar concepts. Emotional clarity has been defined as the ability to understand, identify and distinguish among different emotions (Flynn & Rudolph, 2010; Gohm & Clore, 2002; Salovey et al., 1995), as opposed to feeling emotions in terms of good or bad (Gohm, 2003). In previous studies, deficits in emotion clarity have been found to be associated with ambivalence over emotional expression, depression, and maladaptive stress responses in adults and children (Gohm & Clore, 2000; Gohm, Corser, & Dalsky, 2005; Salovey et al., 1995; Wilkowski & Robinson, 2008).

There is evidence suggesting that different negative emotions can co-exist, and that this emotional state can lead to confusion and discomfort for some individuals (Aaker, Drolet, & Griffin, 2008; Cacioppo, Gardner, & Bernston, 1997). Philippot et al. (2004) argued that emotions experienced at a global level can lead to greater levels of arousal, whereas experiencing emotions clearly or discretely can reduce arousal. Furthermore, previous research using implicit measures of emotional experience shows that individuals who experience emotion in a global way convey less certainty about their emotional state, show slower response time when rating affect and emotion items, and do not rely on adaptive coping strategies to modulate their emotional states (Lischetzke et al., 2005). Studies using self-report measures of emotional clarity have found similar results. For instance, individuals who report being confused about their emotional experiences, and who experience greater intensity of affect, are influenced by moods to a greater extent and tend to resort to avoidance strategies to cope with their emotional state (Gohm, 1999, 2003).

Clarity and Emotion Regulation

Emotional clarity has ramifications for emotion regulation. Specific positive and negative emotions may serve as signals for the initiation of effective emotion regulation (Baumester, Zell, & Tice, 2007). If the negative emotional state is global and diffuse, however, the signal function of the emotion may fail and effective emotion regulation would not take place. This, in turn, would lead to a negative emotional state that remains intense and unresolved.

There is evidence suggesting that individuals who experience negative emotions globally are not adept at using adequate coping strategies to regulate them (Feldman-Barrett et al., 2001).

Similarly, individuals who are not clear about and cannot differentiate between their emotions show uncontrolled and dysregulated stress responses as shown by their rumination and escape tendencies (Flynn & Rudolph, 2010). On the other hand, individuals with high emotion clarity recover from stressful situations and induced negative mood faster (Salovey et al., 1995). Furthermore, emotion clarity has been found to be related to problem-solving; for example, individuals with high emotion clarity show more effective problem-solving behavior and performance when solving complex problems, compared to individuals with low emotion clarity (Otto & Lantermann, 2006). Based on the evidence presented above, it appears that individuals who do not have a clear representation of their emotions cannot access the unique information provided by the discrete emotions. Not only do these individuals lack the tools to regulate negative emotion, but they also seem to rely on maladaptive coping strategies to regulate their negative emotions.

Emotion Labeling

Research on emotions suggests that labeling of emotions is a fundamental aspect of understanding emotional experiences (Izard, 2001). Emotion labeling has been defined by some researchers as the ability to identify, categorize, and name what one is feeling (Swinkels & Giuliano, 1995). Individuals who are able to place labels onto emotions can access motivational and behavioral strategies to cope with those emotions (Frijda, 1993). Studies that have manipulated emotion labeling have found that individuals who are instructed to write down their current emotions and their causes tend to show greater life-satisfaction after a mood induction procedure (Keltner, Locke & Audrain, 1993). Other studies have found that individuals who tend to label emotions are more satisfied with their social support, experience positive affect, report higher self-esteem, are less socially anxious and express greater global life satisfaction (Swinkels & Giuliano, 1995). Conversely, individuals who tend not to label emotions report greater depressive symptoms, maladaptive regulation strategies, and perceived stress (Swinkels & Giuliano, 1995).

The evidence presented regarding the benefits of labeling one's emotions is consistent with findings on the therapeutic technique of Expressive Writing, which, in some instances, has

leads to favorable outcomes, such as improvements of physical health and perceived well-being, as well as reduction in distress, rumination and depressive symptomatology (Gortner, Rude & Pennebaker, 2006; Pennebaker, 1997, Ames et al., 2007; Smyth, 1998). These findings, however, are not consistent in the literature. Whereas some researchers have found evidence for the effectiveness of expressing writing compared to an active control conditions, others have failed to find these differences (e.g., Baikie et al., 2012; Koschwanez et al., 2013; Lu et al., 2010; Niles et al., 2013). The effects of expressive writing have also been examined in the context of smoking cessation. Two studies examined the efficacy of expressive writing among smokers and found greater point-prevalence abstinence rates among those who wrote about their emotional experiences as compared to a control condition (Ames et al., 2005; 2007).

Evidence suggests that expressive writing does not work equally well for all individuals. In fact, Paez, Velasco, and Gonzales (1999) found that expressive writing was most effective for individuals who have difficulty expressing their emotions. Similarly, others have found that expressive writing was most effective in reducing rumination and depressive symptomatology among individuals who reported having difficulty expressing emotions at baseline (Gortner, Rude, & Pennebaker, 2006).

The mechanisms of action underlying the effects of writing about one's emotion experiences are not well understood (Bootzin, 1997). However, some researchers argue that regardless of its mechanisms of action, writing emotional experiences seems to help individuals make sense of their emotional experience and give meaning to those experiences (Guastella & Dadds, 2006). Furthermore, writing about emotional experiences reduces the intensity of both negative and positive emotions (Guastella & Dadds, 2006). Based on the evidence presented previously, it can be argued that expressing one's emotions, including their causes and consequences, facilitates emotional clarity and differentiation. Labeling emotions may relieve the confusion that is caused by global emotional states.

Evidence of Emotional Clarity in Substance Use

Research on emotional clarity in the context of substance use is limited. However, one recent study examined the relationship between individual differences in emotion

clarity/differentiation and alcohol intake in the context of negative emotion (Kashdan et al., 2010). Findings indicated that individuals who differentiated emotions across several time measurements tended to drink less when confronted with intense negative emotions, compared to individuals who experienced emotions in a global fashion. These findings are consistent with previous research in that they show that the press for emotion regulation is greater when emotions are negative and intense, and that global experience of emotion leads to the reliance of maladaptive coping strategies.

Evidence of a relationship between emotion clarity and emotion regulation in nicotine addiction is even more limited and inconclusive. Some studies have examined emotional clarity among adolescents and college smokers (Limonero, Tomás-Sábado, & Fernández-Castro, 2006; Ruiz-Aranda, Fernández-Berrocal, Cabello, & Extremera, 2006; Trinidad, Unger, Chou, & Johnson, 2004). These studies have found emotional clarity to be correlated with smoking rate (cigarettes per day), smoking status, and perceived health risk of tobacco. The former studies are limited in that they are correlational in nature and did not include community samples.

Alexithymia and Tobacco Use

Most of what is known about tobacco use and emotional clarity and differentiation stems from the alexithymia literature, which includes emotional clarity and differentiation as one of its elements. Alexithymia is a complex construct that includes difficulty identifying, differentiating, and describing one's feelings. Individuals with high scores on alexithymia measures also manifest a lack of fantasy and an externally oriented cognitive style (Friedlander et al., 1997; Taylor, 1994). In addition, alexithymic individuals tend to be more neurotic, more vulnerable to stress, and experience greater negative affect and less positive emotion compared to non-alexithymic individuals (Taylor, 1994). There is some evidence suggesting that the difficulty differentiating emotions in alexithymia leads to deficits in communication, labeling and regulation of emotions. The latter, in turn, leads to an undifferentiated, global experience of negative emotions (Krystal, 1998; Friedlander et al., 1997, Lumley, 2000; Taylor, 1994).

A few researchers have examined the role of alexithymia in nicotine addiction; however, the results are inconclusive. There is some evidence suggesting that smokers and non-smokers

differ on measures of alexithymia, with smokers scoring higher than non-smokers (Carton, Bayard, Jouanne & Lagure, 2008). This difference appears to lie mainly on the emotional component of alexithymia, in that smokers reported having more difficulty differentiating, labeling and identifying their emotions compared to non-smokers even after accounting for depression symptomatology. In the study conducted by Carton and colleagues (2008), both self-report and objective measures of alexithymia were used, and the differences found between smokers and non-smokers on alexithymia scores were more apparent on the objective measure of this construct. Other researchers, however, have failed to find these differences between smokers and non-smokers (Lumley et al., 1994). These inconsistent results could be explained by the different methodology and study limitations. The sole use of one self-report measure, the Toronto Alexithymia Scale-20 (TAS-20; Bagby, Taylor, & Parker, 1994a, 1994b), to measure alexithymia has been subject to considerable criticism in this field. Some researchers argue that questionable results can be obtained when asking individuals with deficits in emotional differentiation to accurately estimate their emotional states through self-appraisal, given that this appraisal is usually flawed and biased (Carton et al, 2008; Kashdan et al., 2010). Despite the inconclusive findings, studies on the relationship between alexithymia and nicotine addiction provide some evidence of emotional clarity deficits among smokers that could be examined further using different methodology and better experimental design.

The current study

Although the mechanisms are unknown, a substantial body of literature supports the role that negative affect plays in nicotine dependence. As reviewed previously, not only do smokers report feeling intense episodes of negative affect, but they also report that this affective state is their main motivation to keep smoking. Smokers who are poor at differentiating emotions may be more likely to make this generalization. Furthermore, smokers appear to generalize the relief they experience from smoking upon withdrawal-related negative affect to negative affect in other aspects of their daily life. Clearly, further studies are needed to understand the mechanisms underlying the relationship between negative affect and cigarette smoking. There may be individual differences in how smokers experience negative affect, as not all smokers report

feeling intense negative affect. A subset of smokers may experience negative affect in a global, unclear and undifferentiated fashion, which in turn, may lead to increased intensity of negative affect. Additionally, these smokers may be less able to access emotion-specific information needed to regulate their emotional state. Thus, they would be more likely to resort to maladaptive coping strategies, such as smoking a cigarette, to modulate their affect.

The primary purpose of the present study was to examine the relationship between individual differences in emotional experience and smoking behavior. A second goal was to examine experimentally the ability of emotion labeling to reduce the negative affect. Additionally, we examined whether emotional clarity moderated the effect of emotional labeling upon smoking-related variables.

Specific Aim 1: To examine the association between emotional clarity and smoking motivation.

Hypothesis 1: Emotional clarity will be associated with variables such as craving, global negative affect, and when given an opportunity to smoke, latency to smoke, and total time smoking. Emotional clarity will be also associated with secondary variables related to smoking motivation, such as number of puffs per cigarette, puff duration, intervals between puffs, and smoking satisfaction.

Specific Aim 2: To test whether labeling emotions in a discrete fashion results in changes in smoking motivation.

Hypothesis 2: Smokers who are instructed to label their emotions after a negative affect manipulation will show a reduction in global negative affect, craving to smoke, latency to smoke, and total time smoking compared to those who do not receive the instructions. The labeling manipulation will have the same effect on secondary outcome variables, such number of puffs per cigarette, puff duration, intervals between puffs, and smoking satisfaction.

Specific Aim 3: To examine whether emotional clarity moderates the relationship between the labeling manipulation and smoking motivation.

Hypothesis 3: The greatest effect of the labeling manipulation upon primary and secondary outcome variables will be among those smokers with difficulty experiencing emotions clearly.

Exploratory Aim 1: To examine whether gender moderates the relationship between emotional clarity and smoking motivation. Research on the moderating effects of gender on the relationship between emotional clarity and smoking motivation is limited. One study, however, showed that more women, to a greater extent than men, reported the co-occurrence of negative emotions, which results in higher rumination (Hervas & Vasquez, 2011). There is also evidence indicating that other aspects of emotional awareness, such as attention to feelings, moderates the relationship between depressive symptoms and smoking motivation among females only (Perea-Baena, Fernández-Berrocal, & Oña-Compan, 2011). Given the limited research, the analysis of the moderating effect of gender on the relationship between emotional clarity and smoking motivation will be of an exploratory nature.

Method

Experimental Design

The study was conducted using a two group between-subjects factorial design. It was advertised as a single session research study designed to learn more about smokers' reactions to everyday events, including watching scenes from a movie. Participants first completed baseline assessments measuring nicotine dependence, smoking history and status, demographic information, emotion clarity, motives to smoke, outcome expectancies of smoking, ambivalence tolerance, and affect. After baseline measures were completed, participants received the mood induction, and then they received one of two randomly-determined conditions: 1) labeling emotions instructions, or 2) no labeling emotions instructions. The study also included a correlational component to allow us to test the relationship between emotional clarity and smoking motivation. After the mood induction and emotion labeling procedures, participants were asked to complete additional assessments of affect and urge to smoke. Following these assessments, participants were allowed to smoke ad lib.

Participants

Participants were 170 (86 males; 84 females) current smokers recruited from the Tampa Bay area via flyers, newspapers, internet, and referrals. To participate in the study, participants had to meet the following inclusion criteria: 1) read and understand English, 2) between the ages of 18 and 65, 3) smoke at least 10 cigarettes per day for the past year, 4) exhaled carbon monoxide (CO) of 8 ppm or greater, 5) not using pharmacotherapy for smoking cessation, 6) not currently enrolled in any formal smoking cessation treatment or support group, 7) not pregnant. Participants received a \$25 payment as appreciation for their participation in the study. The study procedures lasted approximately 1.5 hours.

Measures

Telephone Screening Form. A telephone screening form was used during initial contact with participants to establish eligibility criteria. (See Appendix A).

Demographic Form. The demographic form is a 9-item form intended to gather information regarding participants' gender, age, date of birth, education level, occupation, employment status, ethnicity, racial identity, and marital status. (See Appendix B).

Exhaled Carbon Monoxide. Carbon monoxide (CO) level was assessed at baseline to obtain a biochemical verification of smoking status.

Smoking Status Form. The Smoking Status Form (SSF) assessed current smoking status and smoking history. The Fagerström Test for Nicotine Dependence (FTND; Heatherton, Kozlowski, Frecker, & Fagerström, 1991) was included in the SSF as a measure of nicotine dependence. The FTND is considered valid in that it correlates with smoking behavior (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). The FTND is reported to have acceptable internal consistency (.64) and good test-retest reliability (Pomerleau, Carton, Luzke, Flessland & Pomerleau, 1994). (See Appendix C)

Trait Meta-Mood Scale. The Trait-Meta Mood Scale (TMMS; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995) is a 30-item measure that assesses individual differences in emotion processing such as attending, discriminating, and regulating emotions. This measure has strong validity, in that it was found to predict depressive symptoms, rumination, and recovery from negative mood induction (Salovey et al., 1995), and to converge well with other measures of

emotional processing such as the Ambivalence Over Emotional Expressiveness Questionnaire (AEQ; King & Emmons, 1990), the Expectancies for Negative Mood Regulation (NMR; Cantanzaro & Mearns, 1990), and the Life Orientation Test (LOT; Scheier & Carver, 1985). The full measure has 3 scales: Attention to Feelings, Clarity of Feelings, and Mood Repair. The Clarity of Feelings scale was used to test the specific aims of the study. This 11-item scale includes items such as: “I can never tell how I feel,” “I am often aware of my feelings on a matter,” and “I can’t make sense out of my feelings.” The Clarity of Feelings scale has good internal consistency with alpha of .88 (Salovey et al., 1995). Participants were instructed to respond to each item using a 5-point rating scale, indicating their agreement with each statement from 1 (strongly disagree) to 5 (strongly agree). (See Appendix D).

Global measure of affect. A global measure of affect was used to measure valence of negative emotion. This measure included two items. Participants were asked how good/bad and pleasant/unpleasant they felt on a scale of 0 to 8. This global measure of affect has been previously used to validate film induction procedures (Rottenberg, Ray, & Gross, 2007). A global measure of affect was chosen to avoid priming the participants in the no-labeling manipulation with specific emotions. (See Appendix E)

Questionnaire of Smoking Urges-Brief. The Questionnaire of Smoking Urges-Brief (QSU-Brief; Toll, Katulak, & McKee, 2006) is a 5-item brief version of a multidimensional measure of craving and urges to smoke. This measure has two factors: Intention/Desire to Smoke (e.g. “I have a desire for a cigarette right now”) and Relief of Negative Affect and Urgent Desire to Smoke (e.g. “I could control things better right now if I could smoke”). The Cronbach’s alphas found for the factors are good (.91 and .80) (Toll, Katulak, & McKee, 2006). Test-retest reliability has also been found to be good as it ranged from .89 to .90 for the first factor and .76 to .85 for the second factor (Cappelleri et al., 2007). This measure also has good construct and predictive validity as it has been found to discriminate between abstinent and non-abstinent smokers and to predict abstinence and relapse at follow-up (Cappelleri et al., 2007). Participants were instructed to respond to each item using a 7-point rating scale, indicating their agreement with each statement from 1 (strongly disagree) to 7 (strongly agree). (See Appendix F).

Smoking Consequences Questionnaire. The Smoking Consequences Questionnaire - Adult (SCQ-A; Copeland, Brandon, & Quinn, 1995) is a 55-item questionnaire that measures outcome expectancies of cigarette smoking. The SCQ-A has 10 factors, however, for the purpose of this study, only the Negative Affect Reduction, Stimulation/State Enhancement, and Craving/Addiction scales were administered to explore their relationship with individual differences in emotional differentiation among smokers. The internal consistency of the items has been found to be good. Overall, the SCQ-A is a valid measure in that it discriminates smokers' and non-smokers' outcome expectancies and correlates significantly with measures of negative affect (Copeland & Brandon, 1995). Participants were instructed to answer 15 items on a 9-point rating scale, indicating the likelihood of each statement of occurring from 1 (completely unlikely) to 9 (completely likely). (See Appendix G).

The Modified Cigarette Evaluation Questionnaire. The modified Cigarette Evaluation Questionnaire (mCEQ; Cappelleri et al., 2007) is a 12-item self-report measure that assesses the reinforcing and aversive effects of cigarette smoking. The mCEQ consists of five factors: Smoking Satisfaction, Psychological Reward, Aversion (dizziness and nausea after smoking a cigarette), Enjoyment of Respiratory Tract Sensations, and Craving Reduction. Participants were asked to rate each statement based on how smoking made them feel, using a 7-point rating scale. Test-retest reliability has been reported to be 0.90, 0.90, 0.85, 0.80, 0.67, for Smoking Satisfaction, Psychological Reward, Aversion, Enjoyment of Respiratory Tract Sensations, and Craving Reduction respectively. Chronbach's alpha for the mCEQ has been found to be moderate to good (Capparelli et al., 2007). This measure was used to explore the relationship between individual differences in emotional differentiation and the reinforcing and aversive effects of cigarette smoking. (See Appendix H).

Minnesota Nicotine Withdrawal Scale. The Minnesota Nicotine Withdrawal Scale (MNWS; Hughes, 1992) is an 8-item, single factor measure of nicotine withdrawal adapted from the DSM-IV nicotine withdrawal criteria. The items from the MNWS address nicotine withdrawal symptoms such as decreased affect, insomnia, irritability, anxiety, difficulty concentrating, restlessness, increased appetite, and craving to smoke. The MNWS has been found to have fair

to good internal consistency with alpha ranging from .80 to .83 (Toll et al., 2007). The MNSW is also a valid measure of nicotine withdrawal as it has been found to be related to smoking outcome in several clinical studies (Etter & Hughes, 2005; Toll et al., 2007). Participants were instructed to rate, on a 5-point rating scale, the extent to which they experienced nicotine withdrawal symptoms, from 1 (None) to 5 (Severe). This measure was used to control for nicotine withdrawal symptoms at baseline. (See Appendix I).

Smoking Topography. Smoking topography refers to components of smoking behavior, including latency to smoke, number of puffs per cigarette, mean puff duration, mean inter-puff interval, and total time smoking. Smoking topography has been shown to be affected by mood induction procedures (Conklin & Perkins, 2005). Experimental manipulations among smokers have shown the most robust effects on latency to smoke and total time smoking. However, changes in other topography variables, such as number of puffs per cigarette, puff duration, and intervals between puffs were examined as secondary outcome variables. Participants were videotaped and smoking topography variables were coded by two research assistants.

Procedures

Recruitment. Participants were recruited from the Tampa Bay area via flyers, newspapers, internet, and referrals for a study designed to learn more about smokers' reactions to everyday events, including watching scenes from a movie. Individuals interested in participating were briefly screened over the phone to assess the required inclusion and exclusion criteria. Participants who meet the inclusion criteria and agreed to participate were scheduled for a 1.5 hours appointment. Participants were asked to bring their own brand of cigarettes to the appointment and to smoke one hour before their arrival. The sessions were conducted at the Tobacco Research and Intervention Program (TRIP) facility of the Moffitt Cancer Center.

Consent. Before the experimental procedures, the experimenter explained the study's procedures and purposes to the participants. The experimenter went through a consent form with the participants, in which their rights as human research participants were described. Participants were asked to sign the informed consent and a HIPAA form.

Phase 1: Baseline Measures. After obtaining signatures on the informed consent and HIPAA form, the participants' pack of cigarettes was collected. A CO level was measured to verify biochemically their smoking status. Participants were then asked to complete the baseline measures. Baseline measures included the demographic form, smoking status form, TMMS, global measure of affect, QSU-Brief, SCQ-A, mCEQ, and WSWS.

Phase 2: Randomization. After completion of the baseline questionnaires, participants were randomized to one of two conditions: 1) labeling emotions instructions, 2) no labeling emotions instructions. Randomization was stratified by gender and generated by an online computer algorithm.

Phase 3: Mood induction. Mood induction manipulations have been widely used in the nicotine addiction literature. Negative mood induction procedures have been shown to increase smoking behavior, and reward from smoking in the laboratory (Conklin & Perkins, 2005; Heckman et al., in press). Affect can be induced through films, sounds, images, and other techniques. According to a meta-analysis on mood induction techniques, films have been found to induce the greatest positive and negative affect (Westermann, Spies, Stahl, & Hesse, 1996). Furthermore, there is evidence suggesting that films are capable of inducing different types of affective states that vary in intensity (Rottenberg, Ray, & Gross, 2007). In the present study a film clip was used to induce sadness. All participants were instructed to watch a segment of a movie, *The Champ*, which depicts a scene where a young boy witnesses the death of his father. The scene lasted approximately 3 minutes. This film has been extensively used (Gross & Levenson, 1995) and has been shown to induce sadness (Rottenberg, Ray, & Gross, 2007). After the mood induction procedure, all participants were instructed to complete the global measure of affect and the QSU-Brief.

Phase 4: Labeling manipulation. After watching the video clip, participants in the labeling condition were given instructions to write about their emotions on a piece of paper. The instruction were as followed: "*I would like you to think about your current emotions and write down how you felt during and after the film and what made you feel that way. A list of emotions are presented below; please try to use some of these words in your sentences.*" Participants in

the labeling condition were given up to 5 minutes to write about their emotions. As a control for the written labeling instructions, participants in the no-labeling condition were asked to describe the quality of the acting in the movie. All participants were given 5 minutes to write, and then they were asked to complete the global measure of affect and the QSU-Brief. The forms corresponding to the labeling manipulation can be seen in Appendix J and K.

Phase 5. Smoking topography assessment. After completing the labeling manipulation and the second set of measures, the experimenter entered the room and asked the participant to smoke one of his or her own cigarettes. Participants were allowed to take a cigarette from their own pack of cigarettes. The experimenter provided an ashtray and a lighter. Participants were told to take as long as they need to smoke their cigarette. They were videotaped while they smoked their cigarette. Two research assistants coded latency to smoke, number of puffs per cigarette, and total time smoking. The codings were compared and consensus was reached on all discrepancies. Once the participant extinguished the cigarette, the experimenter entered the room and asked the participant to complete the global measure of affect. Information on global affect was collected at this point to examine negative affect relief after smoking. After completion of the scale, the experimenter collected a breath CO sample. Finally, participants were paid for their participation.

Results

Data Quality

Self-report Questionnaire Data. Mean imputation was used to address any missing items on two questionnaires (TMMS and SCQ). If no more than 25% of the items were missing, a mean value for the participant's responses on the other items in the questionnaire was computed and imputed. Overall, the amount of missing data was small and only on a single measure (SCQ) was one participant dropped from analyses.

Normality and outlier check. Shapiro-Wilk tests indicated that mood and craving questionnaire data at all time points violated the assumption of normality. Therefore, these measures were log transformed to address non-normality. Analyses were conducted using both non-transformed and transformed data, producing no differences in results. Therefore, the analyses presented in this paper reflect those conducted with the non-transformed data. Histograms, box plots, and stem and leaf plots were used to examine outliers. Outliers were identified and the data were checked for data entry mistakes. Outliers were not excluded from the analyses.

Behavioral (topography) Data. Technical problems prevented coding of the data for the majority of the sample (e.g., video system recorded over participant videos), which resulted in the loss of topography data for 90 participants. Only 80 participants' data were recovered and coded for analyses. Of these 80 cases, 33 cases belonged to the labeling condition and 47 to the control condition. Topography data was separately coded by two research assistants, and discrepancies were addressed and consensus on the coding of the topography data was reached. Interclass correlation coefficients between the two raters were .98, .97, and .99 for latency to first puff, total time smoking, and number of puffs, respectively.

Participant Characteristics

A total of 170 (86 males, and 84 females) participants met all inclusion criteria for the study and are included in the final sample. Demographic data are presented in Table 1, and mean scores for baseline measures are shown in Table 2. There were no significant differences among the two study conditions on demographic variables or other baseline measures (p 's > .05).

Table 1

Participant Demographic Characteristics (percentages)

| Variable | Labeling | |
|------------------|---------------|-------------------|
| | Condition | Control Condition |
| N | 84 | 86 |
| Age (mean, SD) | 36.74 (12.16) | 38.08 (11.80) |
| Race | | |
| American Indian | 0 | 2.3 |
| Asian | 1.2 | 0 |
| Native Hawaiian | 1.2 | 0 |
| African-American | 21.4 | 24.4 |
| Caucasian | 75.0 | 72.1 |
| Mixed | 1.2 | 1.2 |
| Ethnicity | | |
| Hispanic | 14.3 | 20.9 |
| Marital status | | |
| Single | 67.9 | 55.8 |
| Married | 13.1 | 16.3 |
| Separated | 7.1 | 11.6 |
| Divorced | 11.9 | 12.8 |

Table 1, continued.

| | | |
|---------------------|------|------|
| Widowed | 0 | 3.5 |
| Education | | |
| < HS | 13.1 | 15.1 |
| HS grad | 33.3 | 25.6 |
| Some college | 28.6 | 31.4 |
| Tech school/AA | 14.3 | 14.0 |
| ≥ 4-yr degree | 6 | 10.5 |
| School beyond 4 yrs | 2.4 | 2.3 |
| Professional degree | 2.4 | 1.2 |
| Income | | |
| Under \$10,000 | 50.0 | 44.2 |
| \$10,000 - \$19,999 | 16.7 | 15.1 |
| \$20,000 - \$29,999 | 8.3 | 11.6 |
| \$30,000 - \$39,999 | 9.5 | 11.6 |
| \$40,000 - \$49,999 | 4.8 | 5.8 |
| \$50,000 - \$59,999 | 4.8 | 5.8 |
| \$60,000 - \$69,999 | 2.4 | 3.5 |
| \$70,000 - \$79,999 | 2.4 | 2.3 |
| \$80,000 - \$89,999 | 1.2 | 0 |
| Over \$90,000 | 0 | 0 |

Note: Group did not differ on any variable ($p > .05$)

Table 2*Participant Baseline Characteristics (Means and Standard Deviations)*

| Variable | Labeling Condition | Control Condition |
|--|--------------------|-------------------|
| N | 84 | 86 |
| Time since last cigarette (min) | 33.96 (20.74) | 33.48 (21.40) |
| Years Smoked | 18.33 (12.49) | 19.08 (11.79) |
| Cigarettes per day | 18.35 (7.67) | 17.55 (6.95) |
| Fagerstöm Test for Nicotine Dependence | 5.26 (2.26) | 5.03 (2.24) |
| Carbon Monoxide Level (ppm) | 28.44 (14.63) | 28.79 (14.79) |
| Questionnaire of Smoking Urges - Brief | | |
| Total | 15.81 (7.05) | 16.31 (7.01) |
| Global Measure of Affect | 5.82 (6.10) | 6.10 (1.40) |

Note: Group did not differ on any variable ($p > .05$)

Mood Manipulation Check

The study included a mood induction procedure to induce negative affect across the two conditions. A 2 x 2 ANOVA was conducted to examine the main effects of time (pre and post mood induction) and condition on the Global Measure of Affect scale. See Table 3 for means and standard deviations of affect ratings before and after the mood induction for each condition. As expected, the results show a main effect of time, $F(1, 168) = 87.51, p < .001$, but no main effect of condition, $F(1, 168) = 1.50, p = .223$, nor time by condition interaction, $F(1, 168) = .012, p = .912$. These findings suggest that our induction was successful in decreasing affect ratings across the whole sample.

Table 3

Means and standard deviations for mood ratings before and after the mood induction

| Variables | Labeling condition | | Control condition | |
|-----------------------------|--------------------|------|-------------------|------|
| | M | SD | M | SD |
| Mood pre-induction | 5.82 | 1.87 | 6.10 | 1.40 |
| Mood ratings post-induction | 4.38 | 1.89 | 4.70 | 2.27 |

Note: Global Measure of Affect. Lower scores reflect negative affect.

Aim 1: Correlation between Clarity of Emotions and Primary Outcomes

Pearson's r correlation were conducted to examine the relationship between Clarity of Emotions and primary outcomes (craving, mood, smoking satisfaction, and topography). The analyses indicated that Clarity of Emotions was significantly correlated with the Global Measure of Affect scale and both craving scales (Negative Affect Relief and Desire) at all time points in the study. These results indicate that individuals who scored higher on a measure of Clarity of Emotions reported more positive affect at baseline, after mood induction, and after the manipulation. Clarity of Emotions was significantly correlated with one scale of the Smoking Satisfaction Questionnaire, aversion, indicating that individuals who scored high on Clarity of Emotion reported experiencing more dizziness and nausea when smoking a cigarette. See Table 4. We failed to find a significant relationship between Clarity of Emotion and smoking topography indices (p 's > .05).

Table 4*Correlations Between Clarity of Emotion and Primary Outcomes*

| Primary Outcome | Clarity Overall Sample |
|-------------------------------------|---------------------------|
| Mood | |
| Baseline | .350*** |
| After mood induction | .151* |
| After manipulation | .278*** |
| After smoking a cigarette | .262** |
| Craving | |
| QSU-NA Relief at baseline | -.212** |
| QSU-Total at baseline | -.139 |
| QSU-Desire at baseline | -.003 |
| QSU- Total after mood induction | -.214** |
| QSU- NA Relief after mood induction | -.230** |
| QSU-Desire after mood induction | -.140 |
| QSU-Total after manipulation | -.204** |
| QSU-NA Relief after manipulation | -.223** |
| QSU-Desire after manipulation | -.120 |
| Smoking satisfaction | |
| Smoking satisfaction | .045 |
| Psychological Reward | -.107 |
| Aversion | -.231** |
| Respiratory Track Sensations | .083 |
| Craving | -.032 |
| Total scale | -.082 |
| Topography | |
| Latency to first cigarette | .078 |
| Total time smoking | .001 |

Table 4, continued.

| | |
|-----------------------|-------|
| Total number of puffs | -.068 |
|-----------------------|-------|

* $p < .05$, ** $p < .01$, *** $p < .001$

Aim 2: Main Effect of Labeling Emotions on Primary Outcomes

We conducted 2 x 2 ANOVAs to examine the main effect of labeling condition and time (pre and post-manipulation scores) on negative affect and craving to smoke. Table 5 shows the means and standard deviations for the affect and craving ratings from before to after the labeling manipulation. The ANOVAs showed no main effect of condition or interaction on any of the primary outcomes (p 's > .05). There was a main effect of time on affect ratings and the two craving subscales, negative affect relief, and desire for a cigarette. These values are presented in Table 6. These results suggest that affect improved after the labeling manipulation for both conditions. Regarding craving, QSU scores for the Negative Affect Relief scale decreased significantly from before to after the manipulation; however, the scores for Desire significantly increased. ANOVAs were conducted to examine the main effect of condition on latency to first cigarette, total time smoking, and number of puffs per cigarette. Means and standard deviations for topography data are presented in Table 7. The findings showed no main effect of condition on any topography variable.

Table 5

Means and standard deviations for self-reported affect and craving before and after the manipulation

| Variables | Pre-manipulation | | | | Post-manipulation | | | |
|------------------------------|------------------|------|---------|------|-------------------|------|---------|------|
| | Labeling | | Control | | Labeling | | Control | |
| | M | SD | M | SD | M | SD | M | SD |
| Mood ratings | 4.38 | 1.89 | 4.70 | 2.27 | 4.94 | 1.87 | 5.42 | 1.87 |
| QSU – Negative affect relief | 8.65 | 5.38 | 9.02 | 5.6 | 8.07 | 5.66 | 8.79 | 5.86 |
| QSU - Desire | 9.26 | 3.57 | 8.51 | 3.72 | 9.45 | 3.81 | 9.03 | 3.56 |

Note: QSU = Questionnaire of Smoking Urges

Table 6

Main effect of time and condition and their interaction on mood and craving ratings after the labeling manipulation

| Variable | <i>F</i> | <i>P</i> |
|----------------------------|----------|----------|
| Affect rating | | |
| Time | 26.73 | <.000 |
| Condition | 2.05 | .155 |
| Time * Condition | .43 | .516 |
| QSU Negative affect relief | | |
| Time | 6.14 | .014 |
| Condition | .412 | .522 |
| Time * Condition | 1.135 | .288 |
| QSU Desire for a cigarette | | |
| Time | 8.82 | .003 |
| Condition | 1.130 | .289 |
| Time * Condition | 1.917 | .168 |

Note: QSU = Questionnaire of Smoking Urges

Table 7*Means and standard deviations for topography data*

| Variables | Labeling Condition | | Control Condition | |
|----------------------------------|--------------------|--------|-------------------|--------|
| | N = 33 | | N = 47 | |
| | M | SD | M | SD |
| Latency to first cigarette (sec) | 76 | 221.28 | 155.83 | 369.97 |
| Total time smoking (sec) | 414.27 | 225.47 | 432.77 | 234.74 |
| Number of puffs per cigarette | 14.18 | 7.11 | 16.11 | 9.68 |

Aim 3: Interaction between Clarity of Emotion and Condition

A multiple regression was conducted to test if Clarity of Emotion moderated the effect of the labeling manipulation upon the primary outcome measures (mood, craving, smoking satisfaction, and topography). Condition was entered in the model first, followed by Clarity of Emotion, and then the interaction term. All interactions were non-significant (p 's > .05). See Table 8.

Table 8*Regression examining the ability of emotional clarity to moderate the effect of labeling upon outcome variables*

| | B | Std. Error | Beta | <i>t</i> | <i>p</i> |
|------------------------------|------|------------|------|----------|----------|
| Affect ratings | | | | | |
| Condition | 2.93 | 1.80 | .78 | 1.63 | .105 |
| Clarity | .17 | .068 | .57 | 2.54 | .012 |
| Interaction | -.06 | .045 | -.77 | -1.43 | .156 |
| QSU - Negative Affect Relief | | | | | |
| Condition | -.67 | 5.63 | -.06 | -.12 | .905 |
| Clarity | -.27 | .21 | -.29 | -1.27 | .207 |
| Interaction | .04 | .14 | .16 | .29 | .774 |
| QSU - Desire | | | | | |

Table 8, continued.

| | | | | | |
|----------------------------|---------|--------|------|------|------|
| Condition | 1.41 | 3.68 | .19 | .38 | .702 |
| Clarity | -.01 | .14 | -.01 | -.04 | .971 |
| Interaction | -.04 | .09 | -.27 | -.48 | .629 |
| Latency to first cigarette | | | | | |
| Condition | -135.57 | 435.93 | -.21 | -.31 | .757 |
| Clarity | -4.79 | 17.07 | -.10 | -.28 | .780 |
| Interaction | 2.37 | 10.95 | .39 | .49 | .625 |
| Total Time Smoking | | | | | |
| Condition | -158.05 | 317.65 | -.34 | -.50 | .620 |
| Clarity | -6.95 | 12.44 | -.20 | -.56 | .578 |
| Interaction | 4.51 | 7.98 | .45 | .57 | .574 |
| Puffs per cigarette | | | | | |
| Condition | -11.75 | 11.87 | -.67 | -.99 | .325 |
| Clarity | -.63 | .47 | -.48 | 1.35 | .182 |
| Interaction | .35 | .30 | .93 | 1.18 | .241 |

Exploratory Aim 1: Gender as a Moderator of the Relationship between Emotional Clarity and Smoking.

As an exploratory aim, we examined whether gender moderated the relationship between emotional clarity and smoking motivation. We first conducted an independent samples *t*-test to examine baseline differences among males and females on Clarity of Emotion. We found a trend in which females ($M = 38.60$, $SD = 6.65$) scored lower on Clarity of Emotion than men ($M = 40.42$, $SD = 5.72$), $t(168) = 1.92$, $p = .057$. Regression analyses were conducted to examine the main effects of gender, Clarity of Emotion, and the interaction between the two upon the primary outcome measures (mood, craving, smoking satisfaction, and topography). See Table 9. Gender was entered in the model first, followed by Clarity of Emotion, and then the interaction term. There was no main effect of Gender, Clarity of Emotion, or interaction on affect, craving, or

topography. However, there was a main effect of gender, Clarity of Emotion, and a trending interaction for Aversion. These results suggest that females with low Clarity of Emotion tend to experience more aversive effects (e.g., nausea and dizziness) when smoking a cigarette.

Table 9

Regression examining the main effects of gender and clarity, and the interaction between the two upon primary outcome variables

| | B | Std. Error | Beta | <i>t</i> | <i>p</i> |
|-------------------------------------|-------|------------|------|----------|----------|
| Affect Ratings | | | | | |
| Gender | -1.65 | 1.83 | -.44 | -.90 | .368 |
| Clarity | .02 | .08 | .07 | .29 | .770 |
| Interaction | .04 | .05 | .43 | .84 | .405 |
| QSU – Negative Affect Relief | | | | | |
| Gender | 6.66 | 5.65 | .58 | 1.18 | .240 |
| Clarity | .02 | .23 | .02 | .08 | .936 |
| Interaction | -.13 | .14 | -.49 | -.94 | .348 |
| QSU - Desire | | | | | |
| Gender | 2.48 | 3.68 | .34 | .67 | .502 |
| Clarity | -.00 | .15 | -.00 | -.02 | .987 |
| Interaction | -.04 | .09 | -.20 | -.39 | .698 |
| mCEQ - Satisfaction | | | | | |
| Gender | -.98 | 1.61 | -.31 | -.61 | .542 |
| Clarity | -.03 | .07 | -.13 | -.50 | .621 |
| Interaction | .03 | .04 | .39 | .74 | .461 |
| mCEQ – Psychological Reward | | | | | |
| Gender | -.50 | 1.51 | -.17 | -.33 | .743 |
| Clarity | -.05 | .06 | -.22 | -.87 | .388 |
| Interaction | .02 | .04 | .28 | .53 | .594 |
| mCEQ - Aversion | | | | | |

Table 9, continued.

| | | | | | |
|-------------------------------|---------|--------|------|-------|------|
| Gender | -2.64 | 1.32 | -.97 | -2.00 | .047 |
| Clarity | -1.5 | .05 | -.67 | -2.67 | .008 |
| Interaction | .06 | .03 | .89 | 1.74 | .083 |
| mCEQ – Respiratory Track | | | | | |
| Gender | .64 | 1.89 | .17 | .34 | .735 |
| Clarity | .05 | .08 | .15 | .58 | .560 |
| Interaction | -.01 | .05 | -.13 | -.25 | .803 |
| mCEQ - Craving | | | | | |
| Gender | 1.85 | 1.66 | .57 | 1.11 | .267 |
| Clarity | .06 | .07 | .25 | .95 | .345 |
| Interaction | -.05 | .04 | -.59 | -1.11 | .265 |
| Latency to first cigarette | | | | | |
| Gender | 113.52 | 475.46 | .18 | .24 | .812 |
| Clarity | 8.58 | 20.84 | .18 | .41 | .682 |
| Interaction | -2.85 | 11.88 | -.20 | -.24 | .811 |
| Total time smoking | | | | | |
| Gender | -258.92 | 343.26 | -.55 | -.75 | .453 |
| Clarity | -10.49 | 15.05 | -.30 | -.70 | .488 |
| Interaction | 6.08 | 8.58 | .59 | .71 | .481 |
| Number of puffs per cigarette | | | | | |
| Gender | -7.734 | 12.92 | -.44 | -.60 | .551 |
| Clarity | -.50 | .57 | -.38 | -.88 | .383 |
| Interaction | .25 | .32 | .62 | .76 | .451 |

Discussion

This study examined the relationship between individual differences in emotional experience - in particular, emotional clarity - and affect, craving, smoking satisfaction, and smoking behavior. A second goal of the study was to examine the ability of emotion labeling to reduce negative affect and smoking motivation. Additionally, we tested emotional clarity as a moderator of the relationship between emotional labeling and smoking motivation variables.

We found that emotional clarity was significantly related to affect, self-reported cravings, and smoking aversion (experiencing nausea and dizziness when smoking a cigarette). We did not find a main effect of labeling emotions on smoking motivation variables, nor did we find the hypothesized moderation effect.

Relationship between emotional clarity and smoking motivation

Previous research has shown an inconclusive relationship between emotional clarity and smoking-related variables. Although some researchers have found that smokers and non-smokers differ significantly in measures of emotional clarity (Carton, Bayard, Jouanne & Lagure, 2008), others failed to find this relationship (Lumley et al., 1994). These studies have relied on the Toronto Alexithymia Scale-20, which has been subject to considerable criticism. The first aim of this study was to use an alternative measure of emotional clarity and examine its relationship with smoking motivation. The present study showed significant correlations between emotional clarity and global negative affect and craving across time points, as well as an aversion response to smoking a cigarette. These results indicate that individuals who scored high on emotional clarity reported lower negative affect and cravings for a cigarette throughout the study. Also, individuals who scored high on emotional clarity reported more aversive reactions (e.g., nausea, dizziness) to smoking a cigarette. Possibly, individuals who score high on Emotional Clarity might also be more aware of their physiological reactions. However, we know of no research that has examined this possibility. Interestingly, however, emotional clarity was not related to nicotine

dependence scores, cigarettes per day, and years smoking. Given these results, it seems that emotional clarity is not related to general smoking history variables, but to craving to smoke at the moment. Moreover, the relationship between emotional clarity and craving did not translate to smoking behavior as measured by topography, although the analyses were underpowered due to the technical problems.

Effect of labeling on smoking motivation and affect

Labeling emotions and expressive writing have been found by previous research to be beneficial upon a variety of outcomes, including depression symptomatology, physical health, reports of well-being, and rumination. (Gortner, Rude & Pennebaker, 2006; Pennebaker, 1997, Ames et al., 2007; Smyth, 1998), particularly among those who have difficulty expressing their emotions (Paez, Velasco, and Gonzales, 1999). The second aim of our study was to examine the ability of emotion labeling to reduce negative affect and craving that resulted from a negative affect induction. We failed to find main effects of condition on any primary or secondary outcome. In fact, mood ratings improved after the labeling manipulation for participants in each condition. Interesting findings emerged for craving, as scores on one scale of the craving scale used in the study, Negative Affect Relief, decreased, while scores on another scale of the same measure, Desire, increased.

There are several possible explanations for these findings. These results could be explained by the fact that emotions are transient and fleeting, meaning improvement in mood could be a result of the passage of time, rather than the writing itself. Another possible explanation is that writing, in general, may be a coping strategy, regardless of what individuals are writing about. As a consequence, individuals who engage in writing may experience less negative affect, thus feeling less inclined to smoke to relieve negative affect. Further, the writing task – regardless of content - could have engaged aspects of cognition, such as attention and memory. Research on the relationship between affect and cognition suggests that the recruitment of brain regions related to attention, memory, and self-control, such as the ventromedial prefrontal cortex, results in better mental health (Reekum et al., 2007) and modulation of affect (e.g.,

Berkman & Lieberman, 2009; Etkin, Prater, Hoefft, Menon, & Schatzberg, 2010; Gyurak, Gross, & Etkin, 2011).

Interestingly, our findings showed that while some aspects of craving decreased (wanting a cigarette to relieve affect), others increased (desire/urge for a cigarette) for participants in each condition, after the writing manipulation. Participants might not have felt inclined to smoke a cigarette to relieve their negative affect because their affect improved after the writing exercise. But desire for a cigarette significantly increased from before to after the writing exercise. It is possible that this reflected an increase in nicotine withdrawal symptoms associated with the passage of time since the last cigarette. But it is not clear why this would not be manifested on the first factor of the QSU-5, given the key role negative affect in nicotine withdrawal (Baker et al., 2004), unless the decline in induced negative affect was more potent than the increase in withdrawal-related negative affect.

Moderating effect of emotional clarity on the relationship between labeling emotions and smoking motivation

Although some research has shown that expressive writing does not yield significant benefits when compared to control conditions (e.g., Baikie et al., 2012; Koschwanez et al., 2013), others suggest that it is helpful for individuals who have trouble expressing their emotions (Paez, Velasco, and Gonzales, 1999). Given this research, our third aim examined whether emotional clarity moderated the relationship between the labeling manipulation and smoking motivation. No significant interactions were found, suggesting level of clarity does not moderate the relationship between emotion identification and smoking motivation. In fact, the writing manipulation resulted in more positive affect ratings and lower negative affect relief for all participants, consistent with previous research that failed to find differences between expressive writing and active control conditions (Baikie et al., 2012; Koschwanez et al., 2013).

Both emotional clarity and emotional differentiation have traditionally been described as an individual's ability to understand, describe, and differentiate between emotions (Palmer et al. 2002, Pond et al. 2012, Boden et al., 2012). New research, however, has challenged the idea that these constructs overlap. Boden et al. (2012) proposed that, whereas emotional clarity relates to

the general knowledge of one's emotional experience, emotion differentiation taps into how that knowledge is applied moment-to-moment. More specifically, emotional clarity appears to be related to general information about one's emotional experience, which includes an understanding of the different types of emotions and what causes them (Boden & Berenbaum, 2011; Coffey, Berenbaum, & Kerns, 2003; Gohm & Clore, 2000, 2002). On the other hand, emotion differentiation is related to a person's ability to identify, label, and represent emotions at the moment they occur (Boden et al., 2012). Boden et al. (2012) found little correlation between the two constructs. In the present study, the terms were used interchangeably based upon previous research and given their theoretical similarities. The possibility that they do not measure the same construct poses a limitation for our study.

Although these two constructs are presented as theoretically the same, the way they are measured differs. Given that emotional clarity relates to a general knowledge of one's emotional experience, this construct is measured retrospectively through self-report measures (Boden et al. 2012). Emotion differentiation, on the other hand, relates to how that knowledge is applied. As such, measures of emotion differentiation assess subjective experience of affect at a particular moment in time using performance-based and indirect measures (e.g., Barrett et al., 2001; Kashdan et al., 2010; Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990; Pond et al., 2012; Tugade et al., 2004). In our study we did not use performance-based measures; therefore, our scale may not have adequately captured emotional differentiation.

Limitations

This study contributes to the field by showing a relationship between emotional clarity and smoking motivation. However, it has important limitations. First, we relied on self-report measures to assess the ability of individuals to discriminate between emotions. As recent research suggests, performance-based measures and ecological momentary assessment could possibly capture this construct better. A second important limitation of this study is the low power we had to find effects of our variables of interest on topography data. Due to technical problems with video equipment, we lost the majority of our behavioral data recordings. A third limitation was that this study did not include withdrawal measures at different time points, only at baseline.

Measure of withdrawal could have helped us explain why urge ratings increased after the writing manipulation, or account for withdrawal as a possible covariate.

Conclusions and Implications

This study contributes to the literature by expanding our understanding of the relationship between an individual's emotional experience and smoking motivation. The findings of this study showed that emotional clarity is significantly related to mood and cravings among smokers. Furthermore, emotional clarity was related to having experienced aversive effects, such as nausea and dizziness, after smoking a cigarette. Although our hypothesis that the expressive writing would result in better outcomes was not supported, affect ratings improved and participants reported a lower need to smoke a cigarette to relieve their negative affect after any writing task. Although the latter could have resulted from the mere passage time, it also poses interesting questions about the mechanisms behind the effects of writing, and it opens the possibility that any type of writing (or perhaps any distracting activity) could be useful exercises for mood management by smokers wanting to quit. Overall, individuals who score high on a measure of emotional clarity report better mood and lower cravings compared to those with lower scores. Although these findings support previous studies showing a relationship between emotional clarity and mood, this study is the first one to establish such a relationship with craving for a cigarette and aspects of smoking satisfaction. Although contrary to our hypothesis, the findings regarding the consequences of the labeling manipulation also contribute to the literature by providing ideas for future exploration.

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Appendices

Appendix A: USF IRB Approval Letter



DIVISION OF RESEARCH INTEGRITY AND COMPLIANCE
 Institutional Review Boards, FWA No. 00001669
 12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33613-4799
 (813) 974-5658 • FAX (813) 974-5618

10/25/2011

Nicole Marquinez
 H Lee Moffitt Cancer Center
 9481 Highland Oak Dr. Unit 213

RE: **Expedited Approval** for Initial Review
 IRB#: Pro00006042
 Title: **Testing Individual Differences in Negative Affect Related to Smoking: The Role of Emotional Clarity**

Dear Ms. Marquinez:

On 10/25/2011 the Institutional Review Board (IRB) reviewed and **APPROVED** the above referenced protocol. Please note that your approval for this study will expire on 10/25/2012.

Approved Items:

Protocol Document(s):

[Protocol](#)

Consent/Assent Documents:

[Informed Consent Form.pdf](#)

Please use only the watermarked/stamped consent form(s) found under the "Attachment Tab" in the recruitment of participants.

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review category:

- (3) Prospective collection of biological specimens for research purposes by noninvasive means.
- (6) Collection of data from voice, video, digital, or image recordings made for research purposes.
- (7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural

Appendix A, Continued

beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Please note, the informed consent/assent documents are valid during the period indicated by the official, IRB-Approval stamp located on the form. Valid consent must be documented on a copy of the most recently IRB-approved consent form.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,



John A. Schinka, Ph.D., Chairperson
USF Institutional Review Board

Cc: Christina Calandro
USF IRB Professional Staff

Appendix B: Moffitt SRC Approval Letter



September 23, 2011

Nicole Marquinez
H. Lee Moffitt Cancer Center & Research Institute
University of South Florida
12902 Magnolia Drive
Tampa, FL 33612

Dear Ms. Marquinez:

The Behavioral Subcommittee of the Scientific Review Committee (SRC) has reviewed your response for your research protocol entitled, **"Testing Individual Differences in Negative Affect Related to Smoking: The Role of Emotional Clarity"** (MCC 16906). The revised protocol version 1 dated 09/22/2011 is approved as written for use at the Moffitt Cancer Center pending approval of the Institutional Review Board (IRB) and satisfaction of institutional operational and financial review requirements.

Please be aware that after you receive IRB approval, you must request study activation before you commence any study activities. Please contact Diane Martinez, Manager at The Office of Protocol Review and Monitoring to request study activation, at (813) 745 6349. That office will ensure that all applicable institutional reviews have been completed. You will then be issued an automated activation notification by email.

It is your responsibility to ensure that all Moffitt staff (nursing, pharmacy, data management, etc.) are informed and aware of the details of the project. The committee encourages the use of in-services for those projects that are complex or require special attention.

All changes made to protocols approved by the SRC must be submitted to the Protocol Review and Monitoring System office. Changes made to the protocol document require SRC review and approval. Minor changes (i.e. changes to personnel, non-scientific changes, changes that do not affect patient participation) will be expedited through the SRC review process.

If this project is not being managed by the Clinical Trials Office or Clinical Research Unit, then it is your responsibility to follow through with all requirements for submission to the IRB. All IRB approvals are required to be documented in Oncore, and all associated regulatory documentation (signed applications, IRB approval letters and IRB approved consent forms, etc.) are to be saved in the appropriate study folder in the e-binders directory at J:\binders.

Oncore is the Cancer Center's mechanism for submission and review of materials requiring Scientific Review (SRC) and Protocol Monitoring (PMC). If you need access to Oncore, please contact Jeryl Madden, Oncore Administrator, at 745-6964 for assistance.

Sincerely,

A handwritten signature in black ink, appearing to read "David Drobos".

David Drobos, PhD
Chair, Behavioral Subcommittee
Scientific Review Committee