

DISTRESS TOLERANCE AND SMOKING STATUS: DIFFERENCES BETWEEN  
SMOKERS, FORMER SMOKERS, AND NEVER SMOKERS

By

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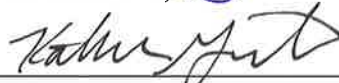
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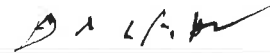
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## ABSTRACT

Distress tolerance has been identified as an important predictor of smoking status, with smokers having lower levels of distress tolerance than never smokers. Other studies have linked higher distress tolerance to more successful smoking cessation. Few studies have evaluated these characteristics in former smokers. This study compared scores on both objective and subjective measures of distress tolerance across smokers, former smokers, and never smokers. Eighty-six participants were recruited from the DC metro community (38 smokers, 27 never smokers, and 21 former smokers; 46.5% female). They completed the self-report Frustration Discomfort Scale (FDS) and a Mirror Tracing Task (MTPT) as well as measures of negative affect, nicotine dependence, and urge. While there were no significant differences between groups on measures of negative affect, urge, or the FDS, never smokers persisted significantly longer on the MTPT than either former smokers or current smokers. There was not a significant difference between smokers and former smokers. Treatment implications of these findings as well as implications for future research are discussed.

*Keywords: Cessation, Distress Tolerance, Former Smokers, Persistence, Mood, Smoking*

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## CHAPTER 1

### INTRODUCTION

Cigarette smoking is one of the leading causes of preventable diseases worldwide today (World Health Organization [WHO], 2002). Smoking has been strongly linked to cardiovascular disease, cancer, respiratory illness, diabetes, as well as numerous oral health issues. While many efforts have been made to educate people about the health risks of smoking and to fund cessation programs, the rate of smoking remains at about 19.3% in the United States (Center for Disease Control and Prevention [CDC], 2011 a). The continued high rate of smoking carries with it a significant healthcare cost to the United States (Barendregt, Bonneux, & van der Maas, 1997) in addition to the individual burden on those who suffer from addiction-related illness. While over half of all smokers report that they wish to quit smoking, only about 6.2% of those who attempt to quit are successful in a given attempt (CDC, 2011 b). There is a growing body of knowledge about the psychological and cognitive features of smokers, but less has been identified about former smokers. Understanding the characteristics of former smokers, including personality and life history, has the potential to provide valuable information on factors that contribute to cessation. More thorough study of successful quitters is necessary to better understand what makes certain people able to quit smoking while others are unable to do so.

One theory that has been linked to successful cessation is that a person's ability to tolerate discomfort can be predictive of his or her ability to successfully quit smoking (e.g., Steinberg et al., 2012). Distress tolerance, sometimes called frustration tolerance, is the willingness and ability of a person to persist in a task in spite of the presence of psychological, physical, or cognitive discomfort that results from continuing (Brown, Lejuez, Kahler, & Strong, 2002). Low levels of distress tolerance has been linked to many pathological behaviors (Leyro,



Zvolensky, & Bernstein, 2010) and seems to be particularly associated with substance use behaviors including a reduced likelihood of seeking assistance when attempting to quit (e.g., MacPherson, Stipelman, Duplinsky, Brown, & Lejuez, 2008) and lower success rates in cessation attempts (e.g., Bornovalova, Gratz, Daughters, Hunt, & Lejuez, 2012). While the mechanism by which distress tolerance affects smoking behavior is not yet fully known, learned industriousness theory forms the basis for the impact of distress tolerance on smoking (Quinn, Brandon, & Copeland, 1996). While this theory explains certain aspects of smoking behavior, other factors such as environment, negative affect, and self-efficacy likely contribute to a person's tendency to smoke or likelihood of quitting (Brown, Lejuez, Kahler, Strong, & Zvolensky, 2005).

Distress tolerance has been shown to correlate with smoking in several areas. Lower distress tolerance has been linked to decreased chances of attempting to quit (McPherson et al., 2008) and increased chances of early lapse (e.g., Brown et al., 2002). In multiple studies, smokers have been found to have lower levels of distress tolerance than never smokers (e.g., Quinn et al., 1996). Based on these findings, treatment programs incorporating learned industriousness theory and the goal of increasing distress tolerance have been pilot tested (Brown et al., 2005). If, as has been theorized, raising distress tolerance facilitates long-term cessation, former smokers may have higher levels of distress tolerance than smokers. Because those who have maintained long-term abstinence from cigarettes have not been directly studied in this field, this important piece of information is missing in our understanding of the role of distress tolerance in smoking cessation.

### Measuring Distress Tolerance

Distress tolerance can be measured using both objective and subjective tests. Objective tests measure a person's persistence on, or latency to quit, a task that involves discomfort after being told that they could stop at any time. Tasks such as breath holding, tolerance of a CO<sub>2</sub> filled room, and the cold-pressor test, in which a participant is asked to hold her hand in cold water until the discomfort becomes unbearable, test tolerance of physical discomfort. The Anagram Persistence Task (APT) measures cognitive persistence by measuring how long participants will persist in solving anagram puzzles that have no solutions. The Paced Auditory Serial Addition Task (PASAT, Lejuez, Kahler, & Brown, 2003), tests a similar construct, while the Mirror Tracing Persistence Task (MTPT) tests how long an individual will persist at a difficult motor task. These tests ask participants to complete a task that is either extremely difficult or impossible to complete in order to induce a sense of frustration. Both of these tasks also make use of corrective feedback in order to increase feelings of frustration.

In efforts to better represent self-reported frustration tolerance, scales such as the Distress Tolerance Scale (DTS, Simons & Gaher, 2005) and the Distress Intolerance Scale (DIS, Schmidt, Richey, & Fitzpatrick, 2006) were created. Several self-report measures such as the DTS and DIS exist to assess a person's level of distress tolerance without using time consuming and potentially uncomfortable behavioral measures. The DTS asks questions more relevant to emotional distress while the DIS focuses on tolerance to physical distress. Harrington (2005) developed the Frustration Discomfort Scale based on theories underlying rational-emotive behavior therapy (REBT), which emphasizes the role that frustration discomfort plays in psychological pathology. This scale is based on the underlying beliefs of participants and therefore measures an individual's perceived frustration tolerance. It measures distress related to

frustration in four categories: discomfort intolerance, entitlement, emotional intolerance, and achievement frustration. In analyses, a four-factor structure was found to have good internal reliability and evidence of discriminative validity (Harrington, 2005). These self-report measures have allowed researchers to examine self-report and behavioral levels of distress tolerance simultaneously.

A recent study found that two behavioral measures of distress tolerance, the PASAT and the MTPT significantly correlate with one another (Schloss & Haaga, 2011). Another study examined the correlations between performance on various behavioral and self-report measures of distress tolerance. In this paper, researchers conducted three studies using behavioral and self-report measures of frustration discomfort: The Anxiety Sensitivity Index (ASI) and the Difficulties in Emotion Regulation Scale compared with the PASAT and cold-pressor task; the DTS and DIS compared with the PASAT and the MTPT (computerized); and the ASI compared with the MTPT (computerized, McHugh et al., 2010). Researchers found that the behavioral measures were highly correlated with each other and that the self-report measures were highly correlated with one another. While the ASI and somatic distress measures were associated with the breath holding and cold-pressor tasks, self-report measures of distress tolerance were not correlated with other behavioral measures (e.g., the MTPT, McHugh et al., 2010). McHugh and Otto 2011, on the other hand, found correlations between subjective and behavioral measures of distress tolerance, in particular between the FDS and MTPT. The variability of these findings raises the question of whether these two sets of evaluations are measuring the same construct, or if they are substantially different. Further research in this area is needed to determine the best way to capture frustration discomfort in a research setting.

### Learned Industriousness and Distress Tolerance

Learned industriousness theory states that an individual's tendency to put forth effort is largely the result of learning that takes place during his or her upbringing. Eisenberger (1992) proposed that receiving reinforcement for high-effort behaviors in early life would lead to an increased likelihood of a person putting forth greater effort in later endeavors. According to Eisenberger, effort can take the form of either physical or cognitive exertions to reach a goal in spite of obstacles. The result of learned industriousness therefore, is the inclination to persist in the face of obstructions, a behavioral indicator of distress tolerance.

Based on Eisenberger's theory of learned industriousness, Quinn and colleagues (1996) first linked cigarette use with task persistence. In line with Eisenberger's thinking, Quinn and colleagues (1996) theorized that smokers may be predisposed to smoking because they had grown used to using low-effort coping skills (such as smoking) throughout their lives. Therefore, individuals with low distress tolerance would be more likely to take up smoking as a means of reducing discomfort, and these same smokers would also be less likely to quit smoking due to the uncomfortable sensations associated with nicotine withdrawal (Quinn et al., 1996). In their study, task persistence in smokers and nonsmokers was measured using cognitive and motor persistence tasks. The authors found that nonsmokers persisted significantly longer than did smokers on frustrating tasks and that this was independent of other demographic variables, supporting the theory of learned industriousness. Recent evidence from Perkins, Karelitz, Giedgowd, Conklin, and Sayette (2010) supports this theory, finding that, in smokers with low distress tolerance, smoking reinforcement is increased after a period of abstinence. Previous studies had similar findings among other substance use populations (e.g., Alterman, Tarter, Petrarulo, & Baughman, 2008). Quinn et al. (1996) suggested that future research examine

whether persistence predicts cessation success and maintenance. Within the framework of learned industriousness theory, one would predict that individuals with higher distress tolerance would be more likely to be successful at quitting, and would be more likely to maintain abstinence. This would demonstrate that they are able to work through discomfort in the pursuit of a goal or end point. Further studies began examining distress tolerance and persistence in the context of smoking cessation.

### Distress Tolerance and Abstinence

Other researchers have attempted to apply the principle of learned industriousness to cessation efforts by linking distress tolerance to the ability to abstain from smoking. In 2001, Zvolensky, Feldner, Eifert, and Brown split heavy smokers into two groups: those who had previously abstained from smoking for more than seven days, and those who had not been able to abstain for more than seven days. In tasks of breath holding and the CO<sub>2</sub> filled room, there were no significant differences in persistence between the two groups. In a similar 2002 study, however, Brown, and colleagues looked at smokers who were either early relapsers in previous quit attempts or had sustained at least one quit attempt for at least three months. Brown et al. (2002) found that those smokers who had had sustained quit attempts persisted longer at the PASAT and at being in a CO<sub>2</sub> filled room. The findings of this study indicated that lower levels of distress tolerance might be a risk factor for early relapse among smokers who attempt to quit. Taken together, these findings show that frustration discomfort may be a good predictor of cessation success, but that our measures may not be sensitive enough to show differences between groups with relatively similar smoking histories.

Distress tolerance, as measured by the PASAT, was associated with the length of a participant's most recent abstinence from smoking in a study by Daughters, Lejuez, Kahler,

Strong, and Brown (2005). In this study, researchers administered the PASAT to a group of polysubstance users who were being treated at an inpatient facility for substance use. These findings indicate that distress tolerance may play a role in the addiction process both in smoking, and in other drug use (Daughters et al., 2005), and that in smoking cessation efforts it has the ability to predict the length of time a person can maintain abstinence.

In a continuation of this line of inquiry, Brandon et al. (2003) measured task persistence in the APT and MTPT among a group of smokers who were entering cessation treatment. Participants were followed for 12-months after completing the treatment and were monitored for nicotine use. The study found that, while performance on the APT did not predict outcomes, task persistence on the MTPT predicted sustained abstinence following cessation treatment. In a Brown et al. (2008) study, these results were reinforced. Among a group of 81 smokers with a goal of quitting on their own, researchers administered the breath holding and CO<sub>2</sub> filled room tasks as well as the PASAT. They found that higher scores on the breath holding and CO<sub>2</sub> tasks predicted lower risk of relapse in the quit attempt at a follow-up 28 days later. The PASAT did not predict outcomes in this study (Brown et al., 2008). In contrast to these findings, a study of self-reported distress tolerance by Kalman, Koskinson, Sambamoorthi, and Garvey (2010) did not find that scores on the Persistence Scale of the Temperament and Character Inventory scale predicted outcome in a cessation trial. This highlights the possible differences in measures of behavioral and self-report frustration discomfort.

#### Distress Tolerance and Quit Attempts

While these studies show that smokers with lower levels of distress tolerance are less likely to quit smoking, MacPherson et al. (2008) also found that low distress tolerance smokers are less likely to engage in cessation behaviors in the first place. In this study, researchers

examined distress tolerance in smokers who registered for a smoking cessation program, but never attended the cessation sessions. They found that among this group, low scores of psychological distress tolerance, as measured by the PASAT, were predictive of not attending treatment sessions for young women, and that low physical distress tolerance, as measured by the breath holding and cold pressor tasks, predicted not attending for men. No differences were found on the MTPT (MacPherson et al., 2008).

In an attempt to measure distress tolerance in the absence of a direct behavioral measure, Steinberg and colleagues (2007), used two modified questions from the Tridimensional Personality Questionnaire (“I will keep trying the same thing over again even when I have not had success the first time” and “I will often continue to work on something, even after other people have given up,” Cloninger, 1987) to predict distress tolerance. The researchers then measured plans to quit smoking and past quitting attempts among adolescent smokers, as well as administering the questions to adolescent nonsmokers. This study found that smokers reported persisting less on these questions than nonsmokers, and that those smokers who scored lower were less likely to report having plans to quit smoking. There was no difference, however, on past quit attempts (Steinberg et al., 2007).

Numerous studies have shown that smokers with higher levels of distress tolerance have a higher chance of successful cessation (e.g., Brandon et al., 2003; Brown et al., 2009), and that those individuals who have had more success at quitting have higher levels of distress tolerance (e.g., Daughters et al., 2005; Zvolensky et al., 2001). Other studies have shown that smokers demonstrate less distress tolerance than never smokers (e.g., Quinn et al., 1996), implying that distress tolerance may not only play a role in smoking cessation, but also in smoking initiation.

### Distress Tolerance in Treatment Models

Based on these findings, cessation treatments have been developed including an adapted model of Acceptance and Commitment Therapy (ACT, Brown et al., 2005), which may allow a person to learn better coping skills and to be more tolerant of distressful feelings and thoughts.

A study by Brown et al. (2008) has pilot tested an adapted ACT and behavioral approach to cessation treatment for smokers with good results. Brown and colleagues (2008) created a treatment protocol based on the theory that smoking is negatively reinforced by reducing withdrawal symptoms and that an individual's level of distress tolerance makes him more or less able to cope with the discomfort caused by nicotine withdrawal. In their treatment model, Brown and colleagues worked within the ACT modality to train smokers not to repress their thoughts about smoking and withdrawal, but rather to monitor them during the course of cessation treatment. They also exposed participants to periods of abstinence prior to the quit date in a behavioral strategy to increase a sense of self-efficacy. Following these and other training techniques, smokers who had not previously been able to abstain for over 72 hours were able to maintain longer periods of abstinence than individuals who were not included in the experimental cessation program (Brown et al., 2008).

### Purpose and Objectives for Current Study

While these findings are informative, it remains to be studied whether individuals who have quit smoking successfully, and who have maintained long-term abstinence, have a significantly higher level of distress tolerance than do smokers or if their ability to tolerate distress differs from never smokers. Most previous distress tolerance studies that have focused on individuals who have been able to quit have only looked at those with very short periods of abstinence (e.g., 28 days [Brown et al., 2009]), with the longest being one year (Brandon et al.,



2003). Those few studies looking at former smokers have yielded inconsistent findings. Sabol and colleagues (1999), for example, found that former smokers did not differ from smokers on a self report measure of persistence, but that they were less likely to be novelty seeking. On the other hand, Etter, Pelissolo, Pomerleau, and De Saint-Hilaire (2003) found that former smokers reported higher levels of persistence than smokers on a self report measure, with both groups reporting lower persistence than never smokers. Other studies unrelated to distress tolerance have noted significant personality differences between former and current smokers, indicating that the two groups are distinctive (e.g., Honda, 2005).

Based on the above research, it is well supported that smokers and never smokers differ in their levels of distress tolerance, and that those smokers with increased distress tolerance are more likely to maintain short-term abstinence. Studies looking at former smokers who have maintained abstinence for longer than one year would add to our understanding of the role of distress tolerance in cessation and cessation maintenance. In line with the learned industriousness model, substantially higher levels of distress tolerance in former smokers as compared to smokers could indicate that smokers with higher levels of distress tolerance are more likely to successfully quit. Alternatively, these findings could indicate that levels of distress tolerance increase once a smoker quits. The present study involves comparing three groups: current smokers, former smokers, and never smokers. Determining the levels of distress tolerance in former smokers as compared to smokers and never smokers is an important step in elucidating the details of the effects of learned industriousness theory on smoking behavior. The present study will further this understanding and inform future studies on treatment modalities that aim to tailor cessation therapies to the reduction of distress tolerance.

In addition, the present study will further the work of other researchers (e.g., McHugh et al., 2010, McHugh & Otto, 2011) in determining whether our current objective and subjective measures of distress tolerance target the same construct. By employing both subjective and objective measures of distress tolerance, we aim to determine whether these measures target the same behavioral construct and whether measures in these areas correlate with each other.

Previous studies have failed to show a correlation between the MTPT and self-report measures of frustration discomfort such as the ASI, DTS, and DIS, (McHugh et al., 2010), but have shown correlations between the MTPT and the FDS (McHugh & Otto, 2011). This study aimed to replicate these findings to determine whether the FDS and the MTPT may target the same dimension of distress tolerance.

In the present study, the MTPT was chosen because it has been used as a standard measure of distress tolerance in many of the studies in this field (e.g., Brandon et al., 2003) making comparisons using this measure particularly useful. Measures of nicotine dependence, negative affect, and smoking urge were also included in order to rule out effects of these states on distress tolerance.

Models of learned industriousness theory would anticipate that former smokers would have higher levels of distress tolerance than would current smokers. Those with higher levels of distress tolerance would be more likely to cope with the discomfort of quitting as well as tolerate other external cues to smoke. This theory would predict that those smokers who have the highest level of distress tolerance would be most likely to be able to quit and to maintain abstinence. Based on this and prior findings, it was hypothesized that: 1) never smokers would have the highest levels of subjective and objective distress tolerance; 2) current smokers would have the lowest levels of subjective and objective distress tolerance; 3) results for former smokers would

be more similar to those of never smokers than current smokers; and 4) scores on the FDS and the MTPT would be correlated.

## CHAPTER 2

### METHOD

#### Participants

Participants were recruited from the Washington D.C. metropolitan area using flyers and web-based advertisements (e.g., Craigslist). Participants were categorized as smokers, never smokers, or former smokers. Smokers were selected if they met the following criteria: (1) at least 18 years old; (2) smoke cigarettes daily; (3) smoked at least 10 cigarettes per day; and (4) have been smoking for at least one year. Never smokers: (1) at least 18 years old; and (2) had smoked less than 30 cigarettes in their lifetime. Former smokers: (1) at least 18 years old; (2) previously smoked cigarettes daily; (3) previously smoked at least 10 cigarettes per day; and (4) had not smoked for at least one year.

Ninety participants began the study (39 smokers, 30 never smokers, and 21 former smokers). Data for one smoker and three never smokers were not used because they failed to complete the laboratory portion of the study resulting in a final sample of 86 individuals (46 males, 40 females). Thirty-six of the participants identified themselves as Caucasian, 41 as African American, and 9 as Other. Smokers smoked a mean of 16.3 ( $SD = 6.59$ ) cigarettes per day and former smokers previously smoked a mean of 20.7 ( $SD = 14.60$ ) cigarettes per day prior to quitting. There were no significant differences between the groups in age, gender, or race. The breakdown of other baseline data is provided in Table 1.

Table 1. Demographic Information

<u>Variable</u>	<u>Percent (%) of participants</u>
Sex	
Male	53.5%
Female	46.5%
Age (in years)	43.92 (SD=11.24)
Race	
Caucasian	41.9%
African American	47.7%
Other	10.4%
Highest level of education	
11 <sup>th</sup> grade	
High school (GED)	10.5%
Some college	27.9%
Associate's	8.1%
Bachelor's	34.9%
Some graduate	2.3%
Graduate degree	12.8%
Employment	
Part-time	5.9%
Full-time	56.5%
Unemployed	27.1%
Retired	3.5%
Disability	1.2%
Full-time Student	2.4%

## Measures

Alveolar carbon monoxide breath sample (COa). Breath samples were obtained using a Bedfont Micro Breathalyzer (Medford, NJ). Carbon monoxide readings were used to verify smoking status.

The Center for Epidemiologic Studies Depression Scale (CES-D, Radloff, 1977) is a 20-question scale assessing depression symptomatology. This scale is used to assess the presence of both clinical and sub-clinical levels of depressive symptoms in clinical and normative samples. Previous studies have shown it to be a valid and reliable measure of these symptoms. In the current study, the coefficient alpha for this measure was .917.

The Perceived Stress Scale (PSS, Cohen, Kamarck, & Mermelstein, 1983) is a 10-item scale measuring a person's current perception of stress levels and stressful life events. In multiple studies, including those using smoking populations, this measure has been found to be valid and reliable. In the current study, the coefficient alpha for this measure was .904.

The Fagerström Test of Nicotine Dependence (FTND, Heatherton, Kozowski, Frecker, & Fagerström, 1991) is a six-item validated measure of nicotine dependence. In this study, it was administered to participants who reported being current smokers. Coefficient alpha reliability for this measure in the current study was .569.

The Urge Ratings Scale is a 3-item Likert-type scale. Each item was rated 1-7 indicating a smoker's desires, wants, and cravings to smoke a cigarette (1= Strongly Disagree, 7=Strongly Agree). Similar self-report questions have been used in other studies to assess urge to smoke (Tiffany and Drobes, 1991; Perkins et al., 2008; Sayette, Loewenstein, Kirchner, & Travis, 2005) and the scale has demonstrated reliability and validity (Kozlowski, Pillitteri, Sweeney, Whitfield, & Graham, 1996). Coefficient alpha reliability in the present study averaged .915.

The Frustration Discomfort Scale (FDS, Harrington, 2005) is a 28-item Likert-type scale. Each item was rated 1-5 on how well each statement reflects their own beliefs (1=thought is absent, 5=thought strongly represents beliefs). Each statement assesses a subject's reaction to a specific potentially frustrating situation and measures overall distress tolerance, with higher scores representing lower distress tolerance. Scores fall within four categories: Discomfort intolerance (belief that discomfort should be avoided); Entitlement (the belief that it is necessary that one's needs are met); Emotional intolerance (the belief that emotional distress cannot be tolerated); and Achievement Frustration (belief that one should perform at his or her best). This measure has been shown to have good internal consistency and discriminant validity. In the current study, the coefficient alpha for the FDS total was .930, while the coefficient alpha's for the four subcategories were: Discomfort intolerance: .817, Entitlement: .808, Emotional intolerance: .849, and Achievement Frustration: .836.

The Mirror Tracing Persistence Task (MTPT, Brandon et al., 2003) is a task in which each participant is asked to trace eight drawings while observing his or her hand in a mirror. In this model, the figures are impossible to accurately trace. Participants were timed from when they begin each folder to the time that they either completed it or gave up. Further details of this measure can be found in Brandon et al., 2003 and Quinn et al., 1996. This task is a validated measure of distress tolerance and reflects an objective measure of a person's willingness to endure a frustrating task. The final score is based on totaling the time spent on the last seven drawings. The more time spent on the drawings, the higher the participant's level of distress tolerance. Continued persistence was not incentivized in the current study. There were no differences in mean persistence based on which investigator administered the task. Performance

on this measure has been shown to predict prolonged abstinence in smokers attempting to quit (Brandon et al., 2003). In the current study, the coefficient alpha for the seven trials was .986.

### Procedure

**Recruitment.** Participants were recruited through advertisements in local newspapers, flyers posted near public transportation, and advertisements on [www.craigslist.com](http://www.craigslist.com). Because initial responses to advertisements heavily favored smokers, subsequent advertisements were targeted at groups for which recruitment was lower (e.g., African American male former smokers) in order to match groups based on demographics.

**Phone Screen.** Individuals interested in participating were screened by telephone to determine if they were eligible to participate. Potential participants were told that the experiment required filling out an online survey and completing a laboratory visit. During the sessions they would be expected to complete paper-and-pencil questionnaires and a performance task, as well as provide a breath sample to verify their smoking status. Those who were interested and met one of the sets of criteria, and were between the ages of 18-65, scheduled their appointments. The participants were asked to bring their pack of preferred brand of cigarettes to the first session. Smokers were told that they would be permitted to smoke during the study breaks.

**Online Survey.** Prior to their scheduled appointment, participants filled out a brief online survey that collected demographic information, the FTDN, as well as several questionnaires not reported in this paper. This information was used to confirm the smoking status of the participant.

**Experimental Session.** Upon arrival, the experimenter greeted participants. Participants were led to a room that contained a desk, two chairs, a computer, and speakers. While reviewing the Informed Consent Form, participants were reminded that the session could last for up to three



hours. After consent was obtained, a carbon monoxide breath sample and saliva sample were obtained to confirm smoking status and the experimenter recorded information regarding the participants' nicotine and caffeine use. In addition to those measures detailed above, further measures were collected but are not reported in this paper. Following the experimental session, participants were debriefed and were paid \$50 cash for their participation.

## CHAPTER 3

### RESULTS

#### Data Analytic Strategy

Data Analysis. The data were analyzed using a personal computer-based software package (IBM SPSS Statistics® 20.0, IBM Corp.©, Armonk, NY). Descriptive statistics were computed for the measures used in the analyses and reported as mean and standard deviation.

Total scores for the Mirror Tracing Persistence Task (MTPT), Frustration Discomfort Scale (FDS), CES-D, PSS, and Fagerström Test of Nicotine Dependence (FTND) were computed according to each test's scoring instructions. A series of planned comparisons were conducted among the three groups (Smokers vs. Never smokers, Smokers vs. Former smokers and Former Smokers vs. Never smokers) using Tukey's honest significance tests. Pearson's correlations were used for measuring relationships between continuous variables. Alpha was set at  $p < .05$  for all analyses.

#### Baseline Data

Participants were evaluated for demographics and the three groups were comparable on age, race, and gender. There were no significant differences between smokers, former smokers, and never smokers for scores on the Perceived Stress Scale (PSS) or on the Center for Epidemiologic Studies Depression Scale (CES-D). Smokers reported smoking a comparable number of cigarettes to what former smokers reported prior to quitting. Smokers reported that they had been smoking an average of 20 years, while former smokers reported an average of 12 years smoking prior to quitting,  $F(1, 57) = 7.24, p = .009$  partial  $\eta^2 = .113$ . Female participants were significantly younger than male participants [males:  $M = 46.48, SD = 11.33$ , females:  $M =$

40.98,  $SD = 10.52$ ,  $F(1, 84) = 5.39$ ,  $p = .023$ , partial  $\eta^2 = .060$ ]. No differences were found between males and females on the CES-D, urge questionnaire, or the FTND.

Table 2. Descriptive Statistics

Smoking Group	Smokers	Former Smokers	Never Smokers
FTND	M = 4.97, SD = 1.90		
PSS	M = 15.66, SD = 6.72	M = 16.33, SD = 8.39	M = 17.89, SD = 9.01
CES-D	M = 13.34, SD = 10.63	M = 14.43, SD = 11.56	M = 13.93, SD = 11.75
Urge	M = 9.74, SD = 6.16		
MTPT Total	M = 1046.55, SD = 850.18	M = 1112.00, SD = 815.92	M = 1634.15, SD = 692.837
FDS Discomfort Intolerance	M = 18.05, SD = 5.33	M = 16.52, SD = 5.13	M = 18.11, SD = 5.12
FDS Entitlement	M = 20.82, SD = 6.11	M = 20.14, SD = 4.59	M = 20.81, SD = 5.55
FDS Emotional Intolerance	M = 19.74, SD = 6.48	M = 18.81, SD = 5.77	M = 19.85, SD = 6.19
FDS Achievement Frustration	M = 23.68, SD = 5.90	M = 21.71, SD = 5.07	M = 22.56, SD = 5.76
FDS Total	M = 82.29, SD = 20.45	M = 77.19, SD = 15.16	M = 81.33, SD = 18.88

*Note:* Reported as: Mean (Standard Deviation)

### Distress Tolerance

There was a significant effect of smoking group on time spent on the MTPT, indicating that never smokers persisted longer than both smokers and former smokers, but that former smokers did not persist for significantly longer than did smokers (See Table 3 and Figure 1). Secondary analysis revealed that a greater proportion of never smokers used the maximum time on the MTPT than smokers [never smokers = 59.3%, smokers = 34.2%,  $\chi^2 = 4.01$ ,  $p = .045$ ]. Former smokers were not significantly different from smokers or never smokers in terms of proportion of participants who used the maximum time on the MTPT. Among smokers, scores on the FTND and urge questionnaire did not correlate to time spent on the MTPT (See Table 4).

There were no differences between groups on the FDS for discomfort intolerance, entitlement, emotional intolerance, achievement frustration, or on the total score among the three groups. Among smokers, the scores on FDS scales did not significantly correlate with the FTND (See Table 4). Scores on the Discomfort Tolerance, Entitlement, and Total FDS were positively correlated with scores on the urge questionnaire (See Table 4).

Table 3. Mean Persistence on the Mirror Tracing Persistence Task Across Groups

Smoking Group	Smokers	Former Smokers	Never Smokers
Smokers ( $M = 1046.6$ , $SD = 850.2$ )		$p = .943$	$p = .006^{**}$
Former Smokers ( $M = 1112.0$ , $SD = 815.9$ )	$p = .943$		$p = .045^*$
Never Smokers ( $M = 1634.2$ , $SD = 692.8$ )	$p = .006^{**}$	$p = .045^*$	

Note: \*  $p < .05$ , \*\*  $p < .01$

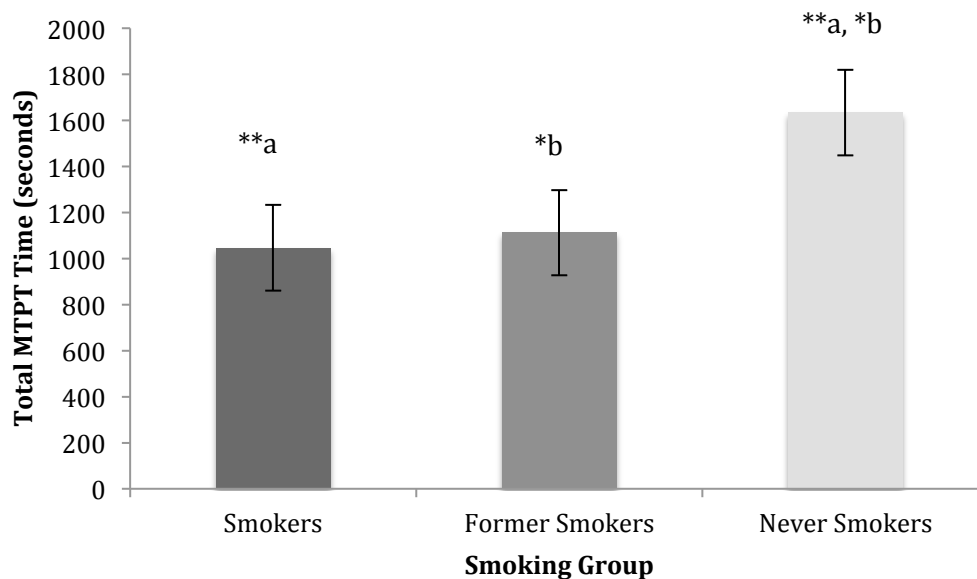


Figure 1. Mirror Tracing Persistence Task and Smoking Group. Tukey Test revealed: a) significant differences between smokers and never smokers, b) significant differences between former smokers and never smokers, \*  $p < .05$ , \*\*  $p < .01$ . Error bars illustrate the Standard Error of the mean.

Table 4. Correlations Between Measures

	MTPT	CESD	PSS	Urge <sup>†</sup>	FTND <sup>†</sup>
MTPT	1	$r(84) = -.066, p = .544$	$r(84) = -.091, p = .407$	$r(84) = -.032, p = .847$	$r(84) = -.244, p = .210$
FDS Discomfort Intolerance	$r(84) = -.168, p = .122$	<b><math>r(84) = .285, p = .008^{**}</math></b>	<b><math>r(84) = .232, p = .032^*</math></b>	<b><math>r(84) = .482, p = .002^{**}</math></b>	$r(84) = .164, p = .362$
FDS Entitlement	$r(84) = -.162, p = .135$	<b><math>r(84) = .300, p = .005^{**}</math></b>	<b><math>r(84) = .308, p = .004^{**}</math></b>	<b><math>r(84) = .372, p = .021^*</math></b>	$r(84) = .333, p = .058$
FDS Emotional Intolerance	$r(84) = -.144, p = .187$	<b><math>r(84) = .363, p = .001^{**}</math></b>	<b><math>r(84) = .332, p = .002^{**}</math></b>	$r(84) = .207, p = .212$	$r(84) = .287, p = .106$
FDS Achievement Frustration	$r(84) = .021, p = .850$	<b><math>r(84) = .258, p = .017^*</math></b>	<b><math>r(84) = .257, p = .017^*</math></b>	$r(84) = .223, p = .179$	$r(84) = .254, p = .155$
FDS Total	$r(84) = -.136, p = .212$	<b><math>r(84) = .366, p = .001^{**}</math></b>	<b><math>r(84) = .366, p = .001^{**}</math></b>	<b><math>r(84) = .367, p = .023^*</math></b>	$r(84) = .304, p = .085$

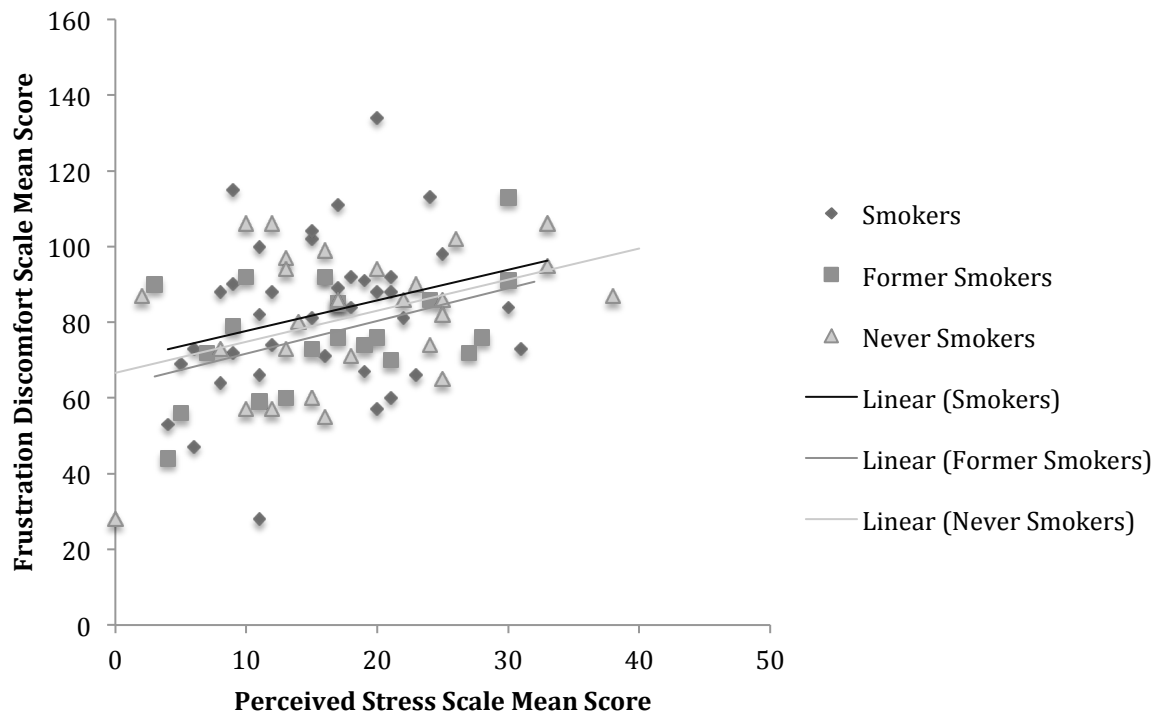
Note: <sup>†</sup> Administered only to smokers; \*  $p < .05$ , \*\*  $p < .01$

Scores on the MTPT were not found to correlate with total FDS scores or with the scores on any FDS subscale (See Table 4).

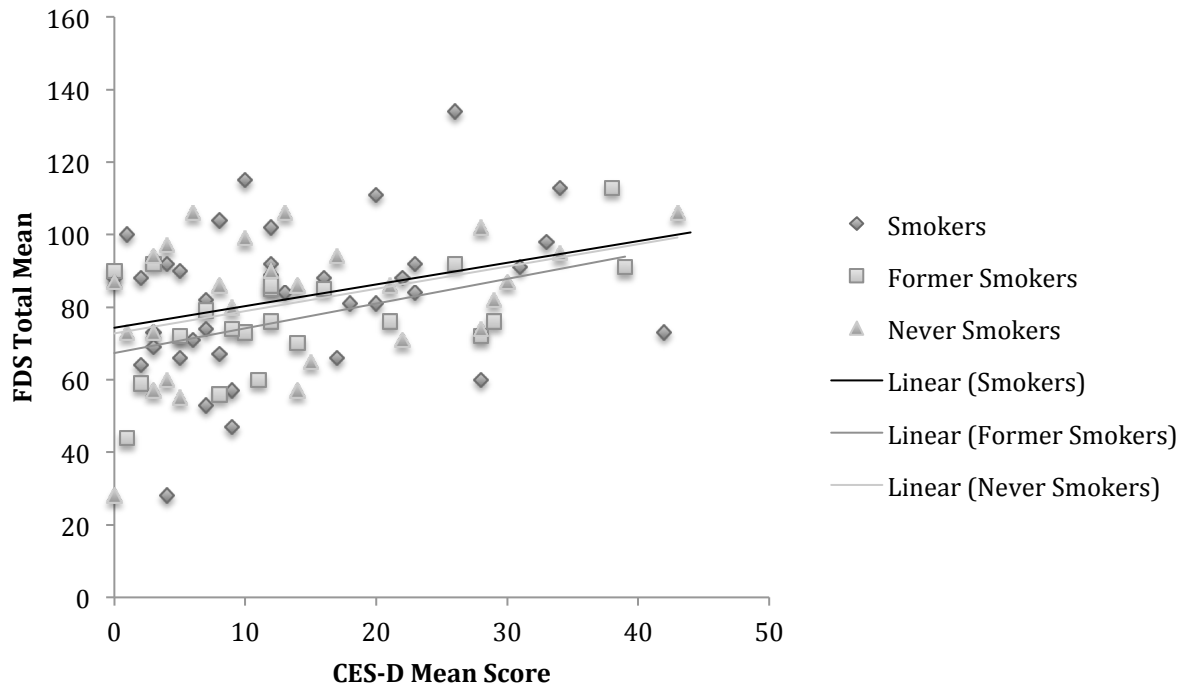
#### Negative Affect

Total scores on the FDS as well as individual scale scores were found to be positively correlated with perceived stress (See Figure 2 and Table 4) and symptoms of depressed mood (See Figure 2 and Table 4).

Scores on the MTPT were not significantly correlated with scores on either the PSS or the CESD (See Table 4).



*Figure 2.* Frustration Discomfort Scale (FDS) and Perceived Stress Scale (PSS). Pearson's Correlation revealed a significant correlation between scores on the FDS and the PSS.



*Figure 3.* Frustration Discomfort Scale (FDS) and Center for Epidemiologic Studies Depression Scale (CES-D). Pearson's Correlation revealed a significant correlation between scores on the FDS and the CES-D.

Among smokers, scores on the FTND were not significantly correlated with scores on the CES-D. They were, however, positively correlated with scores on the PSS (See Table 4).

## CHAPTER 4

### DISCUSSION

This study examined three groups, smokers, former smokers, and never smokers, to determine differences in their willingness to persist on a difficult motor task, and their responses to a self-report measure of distress tolerance. In line with existing research (e.g., Quinn et al., 1996), findings indicate that never smokers persisted significantly longer on the Mirror Tracing Persistence Task (MTPT) than did smokers and former smokers; however, there were no significant differences between smokers and former smokers. For scores on the self-report Frustration Discomfort Scale (FDS), there were no significant differences between the three groups.

Additionally, this study sought to determine if scores on the MTPT and FDS would correlate. According to the findings in the current study, these two measures do not significantly correlate with one another. This is similar to findings comparing other objective and subjective measures of distress tolerance (McHugh et al., 2010), while McHugh and Otto (2011) found that the FDS was significantly correlated with the MTPT. These findings highlight the gap in our understanding of subjective and objective measures of distress tolerance and raise questions about the practicality of using the subjective measures currently available in place of a behavioral measure like the MTPT. It is possible that each of these types of measures has the potential to contribute to our understanding of distress tolerance and its correlates, but further research is necessary to elucidate the underlying constructs measured by each.

Measures of negative affect (PSS and CES-D) were not significantly correlated with persistence on the MTPT. Negative affect was, however, correlated with scores on the FDS, such that increased negative affect was associated with higher scores. Previous studies using the



FDS have found correlations between negative affect such as depression and anxiety symptoms (e.g., Keough, Riccardi, Timpano, Mitchell, & Schmidt, 2010), although Harrington (2006) found that the subscales were differentially correlated to measures of negative affect. The current study found that all subscales were correlated with negative affect suggesting that scores from this scale may be overly influenced by factors other than distress tolerance. In addition, the current study found that scores on two of the FDS subscales, Discomfort Intolerance and Entitlement, as well as the FDS total score were positively correlated to a smoker's perceived urge for a cigarette, a finding consistent with McHugh & Otto (2011). This finding suggests that the FDS is sensitive to the effects of nicotine withdrawal and that, without controlling for urge, it may be more valuable in measuring state rather than trait levels of distress tolerance. Future studies looking at the retest reliability of these measures could shed light on this.

Based on the findings from the MTPT, it would appear that former smokers more closely resemble smokers than never smokers in terms of their willingness to persist in a frustrating task and their distress tolerance. This finding is contrary to expectations based on previous studies that found smokers with higher distress tolerance were more likely to be able to abstain from cigarette use (e.g., Brown et al., 2002; Daughters et al., 2005). One possible explanation for this is that factors that contribute to a person's ability to maintain abstinence over a period of days or even weeks may differ significantly from the resources used to maintain abstinence for over a year. In this regard, participants in the current study differed from those in previous studies because they had maintained long-term abstinence, rather than only brief abstinence.

In addition to the possibility of differences between individuals who maintain long-term versus short-term abstinence, it is possible that distress tolerance, at least as measured by the MTPT, is not an important factor in a person's ability to maintain abstinence from smoking.

Instead, it is possible that distress tolerance is more linked to a person's likelihood of initiating smoking. This would mean that therapeutic interventions to increase distress tolerance might not have long-term benefits in terms of abstinence. Prospective studies of distress tolerance prior to smoking initiation would provide valuable information on this topic.

Another possibility is that distress tolerance is not a constant across a person's lifetime. Indeed, a person may have periods of high distress tolerance, for instance when attempting to quit smoking or accomplish another challenging task, and may at other times have relatively low distress tolerance. In a similar way, distress tolerance may be a finite resource that is used up as individuals manage distress across days. Muraven and Baumeister (2000) posit that self-control resembles a muscle in that using it can make it weaker immediately afterward, but that in the long run it is strengthened through exercise. A similar case may be made for distress tolerance that it can be built up through exercise, but that individuals who are using their distress tolerance may have an immediate depletion of that resource. Future studies examining the test-retest reliability of distress tolerance measures could provide valuable information on the constancy of an individual's distress tolerance across time.

Given the lack of correlation between the MTPT and the FDS found in this study, it appears that these two measures target different constructs. The close correlations between the FDS and measures of negative affect and urge indicate that the FDS may be more sensitive to a person's current state, and perhaps scores from this measure are better indicators of negative affect than of distress tolerance. It may be that the FDS is a better measure for capturing a person's tendency to experience distress, while the MTPT demonstrates how a person might react to the experience of distress. An alternative possibility is that each of these measures targets a different domain of distress tolerance. McHugh et al. (2010) notes that different types of

distress, such as frustration, pain, or fear, may have domain-specific responses that do not generalize. This would mean that each of these measures is effectively capturing an aspect of distress tolerance, but perhaps not the same one. Because of the lack of agreement between the two measures of distress tolerance in this study, it is difficult to draw far-reaching conclusions about how distress tolerance relates to smoking status. Future studies that include additional measures of distress tolerance and measures of general coping and adaptive behaviors would help to better define the constructs of distress tolerance and persistence.

This study has limitations. Sampling from the community yielded different numbers of participants in each of the three groups. It was particularly difficult to recruit former smokers that met criteria. In addition, a post-hoc power analysis indicated that the study may have been underpowered. Future studies with more participants would improve the accuracy of the findings and may give more information on the subtleties of the group differences. Future studies using the MTPT could benefit from a manipulation check to ensure that the task induced distress or discomfort as intended.

This study provides additional evidence that smokers exhibit less distress tolerance than never smokers in some measures. Additionally, it provides initial evidence that former smokers who have maintained long-term abstinence have similar levels of distress tolerance to smokers. This study also, however, illustrates the difficulty of defining distress tolerance as a uniform construct. It provides further evidence that different measures of distress tolerance such as the MTPT and the FDS may be measuring different constructs altogether or that distress tolerance may be composed of multiple dimensions that do not correlate. These data may be used in future studies to target behaviors linked to cessation in order to move toward increasing the success

rates of cessation attempts. This information may help reduce the number of smokers by increasing the efficacy of cessation interventions (WHO, 2011).

## REFERENCES

- Alterman, A.I., Tarter, R.E., Petrarulo, A.B., & Baughman, T.G. (2008). Evidence for impersistence in young male alcoholics. *Alcoholism: Clinical and Experimental Research*, 8(5), 448-450.
- Barendregt, J.J., Bonneux, L., & van der Maas, P.J. (1997). The health care costs of smoking. *The New England Journal of Medicine*, 337(15), 1052-1057.
- Bornovalova, M.A., Gratz, K.L., Daughters, S.B., Hunt, E.D., & Lejuez, C.W. (2012). Initial RCT of a distress tolerance treatment for individuals with substance use disorders. *Drug and Alcohol Dependence*, 122, 70-76.
- Brandon, T.H., Herzog, T.A., Juliano, L.M., Irvin, J.E., Lazev, A.B., & Simmons, V.N. (2003). Pretreatment track persistence predicts smoking cessation outcome. *Journal of Abnormal Psychology*, 112(3), 448-456.
- Brown, R.A., Lejuez, C.W., Kahler, C.W., & Strong, D.R. (2002). Distress tolerance and duration of past smoking cessation attempts. *Journal of Abnormal Psychology*, 111(1), 180-185.
- Brown, R.A., Lejuez, C.W., Kahler, C.W., Strong, D.R., & Zvolensky, M.J. (2005). Distress tolerance and early smoking lapse. *Clinical Psychology Review*, 25(6), 713-733.
- Brown, R.A., Lejuez, C.W., Strong, D.R., Kahler, C.W., & Zvolensky, M.J., Carpenter, L.L., et al. (2009). A prospective examination of distress tolerance and early smoking lapse in adult self-quitters. *Nicotine & Tobacco Research*, 11(5), 493-502.
- Brown, R.A., Palm, K.M., Strong, D.R., Lejuez, C.W., Kahler, C.W., Zvolensky, M.J., et al. (2008). Distress tolerance treatment for early-lapse smokers: Rationale, program description, and preliminary findings. *Behavioral Modification*, 32(3), 302-332.
- Centers for Disease Control and Prevention. (2011 a). Vital signs: Current cigarette smoking among adults aged  $\geq 18$  years – United States, 2005-2010. *Morbidity and Mortality Weekly Report*, 60(35), 1207-1212.
- Centers for Disease Control and Prevention. (2011 b). Quitting smoking among adults – United States – 2001-2005 *Morbidity and Mortality Weekly Report*, 60(44), 1513-1519.
- Cloninger, C.R. (1987). Cloninger, C. R. (1987). The Tridimensional Personality Questionnaire, Version IV. *St. Louis, MO: Department of Psychiatry, Washington University School of Medicine*.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24(4), 385-396.

- Daughters, S.B., Lejuez, C.W., Kahler, C.W., Strong, D.R., & Brown, R.A. (2005). Psychological distress tolerance and duration of most recent abstinence attempt among residential treatment-seeking substance abusers. *Psychology of Addictive Behaviors, 19*(2), 208-211.
- Eisenberger, R. (1992). Learned industriousness. *Psychological Review, 99*(2), 248-267.
- Etter J., Pelissoli, A., Pomerleau, C.S., & De Saint-Hilaire, Z. (2003). Associations between smoking and heritable temperament traits. *Nicotine & Tobacco Research, 5*, 401-409.
- Harrington, N. (2005). The frustration discomfort scale: Development and psychometric properties. *Clinical Psychology & Psychotherapy, 12*(5), 374-387.
- Harrington, N. (2006). Frustration intolerance beliefs: Their relationship with depression, anxiety, and anger in a clinical population. *Cognitive Therapy and Research, 30*, 699-709.
- Heatherton, T.F., Kozlowski, L.T., Frecker, R.C., Fagerström, K.O. (1991). The Fagerström Test for Nicotine Dependence: A revision of the Fagerström Tolerance Questionnaire. *British Journal of Addictions, 86*. 1119-1127.
- Honda, K. (2005). Psychosocial correlates of smoking cessation among elderly ever-smokers in the United States. *Addictive Behaviors, 30*, 375-381.
- Kalman, D., Hoskinson, R., Sambamoorthi, U., & Garvey, A.J. (2010). A prospective study of persistence in the prediction of smoking cessation outcome: Results from a randomized clinical trial. *Addictive Behaviors, 35*(2), 179-186.
- Keough, M.E., Riccardi, C.J., Timpano, K.R., Mitchell, M.A., & Schmidt, N.B. (2010). Anxiety symptomatology, The association with distress tolerance and anxiety sensitivity. *Behavior Therapy, 41*, 567-574.
- Kozlowski, L.T., Pillitteri, J.L., Sweeney, C.T., Whitfield, K.E., & Graham, J.W. (1996). Asking questions about urges or cravings for cigarettes. *Psychology of Addictive Behaviors, 10*(4), 248-260.
- Lejuez, C.W., Kahler, C.W., & Brown, R.A. (2003). A modified computer version of the Paced Auditory Serial Addition Task (PASAT) as a laboratory-based stressor. *the Behavior Therapist, 26*(4), 290-293.
- Leyro, T.M., Zvolensky, M.J., & Bernstein, A. (2010). Distress tolerance and psychopathological symptoms and disorders: A review of the empirical literature among adults. *Psychological Bulletin, 136*(4), 576-600.
- MacPherson, L., Stipleman, B.A., Duplinsky, M., Brown, R.A., & Lejuez, C.W. (2008). Distress tolerance and pre-smoking treatment attrition: Examination of moderating relationships. *33*(11), 1385-1393.

- McHugh, R.K., Daughters, S.B., Lejuez, C.W., Murray, H.W., Hearon, B.A., Gorka, S.M. (2010). Shared variance among self-report and behavioral measures of distress tolerance. *Cognitive Therapy and Research*, 35(3), 266-275.
- McHugh, R.K., & Otto, M.W. (2011). Domain-general and domain-specific strategies for the assessment of distress intolerance. *Psychology of Addictive Behaviors*, 25(4), 745-749.
- Muraven, M., & Baumeister, R.F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin*, 126(2), 247-259.
- Perkins, K.A., Karelitz, J.L., Giedgowd, G.E., Conklin, C.A., & Sayette, M.A. (2010). Differences in negative mood-induced smoking reinforcement due to distress tolerance, anxiety sensitivity, and depression history. *Psychopharmacology*, 210(1), 25-34.
- Quinn, E.P., Brandon, T.H., & Copeland, A.L. (1996). Is task persistence related to smoking and substance abuse? The application of learned industriousness theory to addictive behaviors. *Experimental and Clinical Psychopharmacology*, 4(2), 186-190.
- Radloff, L.S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3), 385-401.
- Sabol, S.Z., Nelson, M.L., Fisher, C., Gunzerath, L., Brody, C.L., Hu, S., et al. (1999). A genetic association of cigarette smoking behavior. *Health Psychology*, 18(1), 7-13.
- Sayette, M.A., Lowenstein, G., Kirchner, T.R., & Travis, T. (2005). Effects of smoking urge on temporal cognition. *Psychology of Addictive Behaviors*, 19(1), 88-93.
- Schloss, H.M., & Haaga, D.A.F. (2011). Interrelating behavioral measures of distress tolerance with self-reported experiential avoidance. *Journal of Rational-Emotive and Cognitive-Behavioral Therapy*, 29(1), 53-63.
- Simons, J.S., & Gaher, R.M. (2005). The Distress Tolerance Scale: Development and validation of a self-report measure. *Motivation and Emotion*, 29(2), 83-102.
- Steinberg, M.L., Krejci, J.A., Collett, K., Brandon, T.H., Ziedonis, D.M., & Chen, K. (2007). Relationship between self-reported task persistence and history of quitting smoking, plans for quitting smoking, and current smoking status in adolescents. *Addictive Behaviors*, 32(7), 1451-1460.
- Steinberg, M.L., Williams, J.M., Gandhi, K.K., Foulds, J., Epstein, E.E., & Brandon, T.H. (2012). Task persistence predicts smoking cessation in smokers with and without schizophrenia. *Psychology of Addictive Behaviors*, 26(4), 855-858.
- Tiffany, S.T., & Drobes, D.J. (1991). The development and initial validation of a questionnaire on smoking urges. *British Journal of Addiction*, 86(11), 1467-1476.

Zvolensky, M.J., Feldner, M.T., Eifert, G.J., & Brown, R.A. (2001). Affective style among smokers – Understanding anxiety sensitivity, emotional reactivity, and distress tolerance using biological challenge. *Addictive Behaviors*, 26(6), 901-915.

World Health Organization. (2011). WHO report on the global tobacco epidemic, 2011: Warning about the dangers of tobacco. ISBN 978 92 4 068782 0 (epub).