Published in final edited form as:

Addict Behav. 2010 May ; 35(5): 419–425. doi:10.1016/j.addbeh.2009.12.005.

Cognitive-Affective Characteristics of Smokers with and without Posttraumatic Stress Disorder and Panic Psychopathology

Anka A. Vujanovic, Ph.D.,

National Center for PTSD – Behavioral Science Division, VA Boston Healthcare System

Erin C. Marshall, B.A.,

University of Vermont

Laura E. Gibson, Ph.D., and

University of Vermont

Michael J. Zvolensky, Ph.D.

University of Vermont

Abstract

The present study evaluated differences among daily smokers with posttraumatic stress disorder (PTSD), panic disorder (PD), panic attacks (PA), and no axis I psychopathology (past 6 months) in terms of several cognitive-affective variables implicated in both the onset and maintenance of anxiety psychopathology and cigarette smoking. The sample consisted of 123 daily smokers (62% women: $M_{age} = 29.7$, $SD = 11.9$). Compared to the PA and no psychopathology groups, the PTSD group reported significantly higher levels of anxiety sensitivity, discomfort intolerance, negative affectivity, anxious arousal, and anhedonic depression; and, the PTSD group reported significantly lower levels of perceived control over anxiety-related events than the PA group. The PD group, compared to those in the PA and no psychopathology groups, reported significantly higher levels of anxiety sensitivity, negative affectivity, and anxious arousal; and significantly lower levels of perceived control over anxiety-related events. No significant differences were evident between the PTSD and PD groups. Theoretical and clinical implications of the present findings are discussed in terms of smoking and emotional vulnerability.

Keywords

cognitive-affective; smoking; PTSD; panic; anxiety disorders

Studies have established significant and practically meaningful associations between cigarette smoking and certain anxiety disorders (Feldner, Babson, & Zvolensky, 2007; Morissette, Tull, Gulliver, Kamholz, & Zimering, 2007; Patton, Carlin, Coffey, Wolfe, Hibbert, & Bowes, 1998; Zvolensky, Feldner, Leen-Feldner, & McLeish, 2005). Some of the most robust, clinically significant relations documented between smoking and anxiety conditions have been evident for posttraumatic stress disorder (PTSD) and panic psychopathology (panic disorder

Correspondence concerning this article should be addressed to Anka A. Vujanovic, Ph.D. Dr. Vujanovic can be contacted at the National Center for PTSD – Behavioral Science Division, VA Boston Healthcare System, 150 South Huntington Avenue (116B-2), Boston, MA 02130; 857-364-5924 (telephone); 857-364-4501 (facsimile); anka.vujanovic@va.gov.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

[PD] with and without agoraphobia; Acierno et al., 2000; Acierno, Kilpatrick, Resnick, Saunders, & Best, 1996; Beckham et al., 1995; Buckley, Mozley, Bedard, Dewulf, & Greif, 2004).

Significantly higher smoking rates have been documented among persons with, compared to those without, PTSD (i.e., greater percentage of 20 or more cigarette per day smokers; Acierno et al., 1996, 2000; Buckley et al., 2004). Also, exposure to traumatic life events, particularly for those individuals with a PTSD diagnosis, is associated with an increase in smoking rate (Breslau, Davis, & Schultz, 2003; Joseph, Yule, Williams, & Hodgkinson, 1993; Koenen et al., 2005; Perkonig, Kessler, Storz, & Wittchen, 2000) as well as poorer cessation outcomes (Hapke et al., 2005; Lasser et al., 2000; Zvolensky, Gibson et al., 2008). With regard to panic psychopathology, studies suggest that smoking co-occurs at higher rates among those with panic attacks and PD than in the general population (Himle, Thyer, & Fischer, 1988; Lasser et al., 2000; McCabe et al., 2004; Pohl, Yeragani, Balon, Lycaki, & McBride, 1992). Additionally, smoking, particularly at higher rates, has been shown to be concurrently and prospectively associated with an increased risk of more severe panic attack symptoms and life impairment related to such symptoms (Breslau & Klein, 1999; Breslau, Novak, & Kessler, 2004; Johnson et al., 2000; McLeish, Zvolensky, & Bucossi, 2007; Zvolensky, Schmidt, & McCreary, 2003). Other work suggests that those with, compared to those without, a history of panic psychopathology experience significantly less success in quitting smoking (Lasser et al., 2000; Zvolensky, Lejuez, Kahler, & Brown, 2004).

Research directly evaluating possible distinctions between smokers with PTSD and PD has found few differences in terms of smoking behavior. In one investigation, Marshall and colleagues (2008) compared community-recruited daily smokers with PTSD and PD to daily smokers with nonclinical panic attacks (PA; defined as the experience of panic attacks in the absence of any axis I psychopathology) and those without current psychopathology (control [C]; no presence of axis I psychopathology within the past 6 months) in terms of a wide array of smoking variables. Results indicated no significant differences among these groups in terms of daily smoking rate or nicotine dependence level (Marshall et al., 2008). However, the PTSD group reported significantly more lifetime quit attempts than the other groups, and the PTSD and PD groups reported more severe symptoms (e.g., headaches, fatigue, anxiety) during past quit attempts (Marshall et al., 2008). The PTSD and PD groups also reported greater motivation to smoke to reduce negative affect than the nonclinical PA or C groups (Marshall et al., 2008). Overall, the findings of the Marshall et al. (2008) investigation suggest that PTSD and PD are meaningfully related to certain smoking-related variables of clinical importance, and that smokers with PTSD and PD tend to reliably differ from daily smokers with nonclinical PA or those with no psychiatric problems (in the past 6 months).

Although research focused on PTSD and panic psychopathology suggests clinically meaningful relations in terms of smoking variables, there is limited empirical work attempting to distinguish between individuals with these anxiety disorders, generally, and smokers with these anxiety disorders, specifically, in regard to cognitive-affective vulnerability factors (Ziedonis et al., 2008). Thus, it is presently unclear if, and how, smokers with PTSD and panic psychopathology differ from one another in regard to cognitive-affective vulnerabilities and how they compare to other smoking groups. Numerous scholars have noted strong similarities in the experience and expression of cognitive-affective vulnerability among persons with PTSD and panic psychopathology (Asmundson & Stapleton, 2008; Falsetti & Resnick, 2000; Hinton, Hofmann, Pitman, Pollack, & Barlow, 2008; Jones & Barlow, 1990; McNally, 2008). However, none of this work has included smokers with these disorders. Additionally, from an empirical perspective, both PTSD and panic psychopathology involve similar core processes at many basic levels of analysis – fears of internal sensations (anxiety sensitivity; Rodriguez, Bruce, Pagano, Spencer, & Keller, 2004), intolerance of physical discomfort (discomfort intolerance;

Schmidt & Lerew, 1998), perceptions that anxiety-related events are beyond personal control (Barlow, 2002), and hyperarousal symptoms (anxious arousal; Watson, 2005). It also is possible that these disorders may share in common a linkage to negative mood states (e.g., negative affectivity; anhedonic depressive symptoms), more generally (Brewin & Holmes, 2003; Hinton & Otto, 2006; Nixon & Bryant, 2005). These shared vulnerability processes are important because they (1) may drive increased risk and maintenance of a relatively wide variety of indices of psychological distress as well as affect-oriented smoking behavior (Hinton & Otto, 2006) and (2) are potentially malleable via intervention (e.g., Otto & Reilly-Harrington, 1999). Thus, knowledge about cognitive-affective vulnerabilities among smokers with PTSD and PD is important for better understanding the phenomenology of these disorders, which frequently co-occur with tobacco use (Goodwin, Zvolensky, & Keyes, 2008).

Together, the overarching aim of the present investigation was to examine a number of theoretically-relevant cognitive-affective factors implicated in models of PTSD and PD among a community-recruited sample of daily smokers. Similar to the Marshall et al. (2008) investigation, daily smokers with PTSD and PD were compared to daily smokers with nonclinical PA and C (no presence of axis I psychopathology within the past 6 months). Groups were defined in a manner consistent with the Marshall et al. (2008) investigation (please see above). It was hypothesized that smokers with PTSD and PD would report higher levels of anxiety sensitivity, discomfort intolerance, perceived control over anxiety-related events, negative affectivity, anxious arousal, and anhedonic depression, as compared to the nonclinical PA and C groups. Significant differences were expected only between – but not within -- the clinical (PTSD; PD) and nonclinical (PA; C) groups. These hypotheses were guided by theoretical models of PTSD and PD and their co-occurrence (Asmundson & Stapleton, 2008; Falsetti & Resnick, 2000; Hinton et al., 2008; Jones & Barlow, 1990; McNally, 2008), which suggest these conditions may be characterized by a number of similar underlying (generalized) vulnerability processes. The present study differs from that by Marshall and colleagues (2008) by being expressly focused on cognitive-affective vulnerability among the studied groups. None of the present research questions have been addressed previously.

Method

Participants

The present data are part of a larger investigation. For a comprehensive description of the methodology for the present study, please see Zvolensky, Gibson et al. (2008). The data presented in the current report are novel and represent a unique contribution not included as part of any of the past work published from this data set. The sample consisted of 123 participants (62% women) with a mean age of 29.7 years ($SD = 11.9$). The racial distribution of the population generally reflected that of the state of Vermont (State of Vermont Department of Health, 2007): 91.9% of participants identified as white/Caucasian; 4.1% identified as Hispanic; 2.4% identified as black/African-American; 0.8% identified as black/Hispanic; and 0.8% identified as 'other.' Participants were daily cigarette smokers and reported smoking a mean of 15.7 cigarettes per day ($SD = 6.7$). The average score on the Fagerstrom Test for Nicotine Dependence (*FTND*; Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991) was 3.1 ($SD = 1.7$), indicating low levels of nicotine dependence. Approximately 66% of participants reported drinking alcohol at least 2–4 times per month and consumed 3–4 drinks on average, per occasion. Additionally, participants scored a mean of 9.1 ($SD = 7.7$) on the Alcohol Use Disorders Identification Test (*AUDIT*; Babor, De La Fuente, Saunders, & Grant, 1989), with 47.2% of participants meeting criteria for at least moderate (i.e., score of 8 or higher) alcohol problems.

Participants were recruited from the greater Burlington, Vermont community, for participation in a 'self-quit' smoking cessation study (i.e., no formal treatment for smoking cessation of any

type was offered), via placement of flyers throughout marketplaces and well-traveled locations and posting of printed advertisements in local newspapers. Recruitment procedures were tailored, via specifically worded flyers and advertisements, to ensure participants with PTSD, PD, nonclinical PA, and no current axis I psychopathology were represented in the sample. As a result of this targeted recruitment strategy, approximately 38.2% ($n = 47$) of the sample met criteria for a current primary axis I diagnosis of PTSD, 13% ($n = 16$) met criteria for a current primary diagnosis of PD, with or without agoraphobia; 20.3% ($n = 25$) met criteria for only current nonclinical PA; and 28.5% ($n = 35$) did not meet criteria for any current (past 6 months) axis I psychopathology (C) or nonclinical PA. On average, the PTSD and PD groups met criteria for 1.30 ($SD = 0.89$) additional axis I diagnoses. The PTSD and PD groups did not significantly differ in mean number of comorbid diagnoses (Marshall et al., 2008). Specifically, in addition to their primary diagnoses, 28 individuals (22.8%) met criteria for generalized anxiety disorder, 22 (17.9%) for major depressive disorder, 9 (7.3%) for social anxiety disorder, 8 (6.5%) for PD, 5 (4.1%) for specific phobia, 4 (3.3%) for PTSD, 3 (2.4%) for dysthymia, 2 (1.6%) for bipolar disorder, and 1 (0.8%) for obsessive compulsive disorder. Among the individuals in the PTSD group, 8 participants (17%) met criteria for PD, and among the PD group, 4 participants (25%) met criteria for PTSD. Inclusionary and exclusionary criteria for the study have been reported elsewhere (see Marshall et al., 2008).

Participants in the PTSD group reported experiencing an average of 3.8 traumatic event types, as reported on the Posttraumatic Stress Diagnostic Scale (PDS; Foa, 1995). With regard to the nature of traumatic events among the PTSD group, 30 participants reported experiencing non-sexual assault by a family member or someone known; 30 participants reported experiencing sexual contact with someone five years or older before the age of 18; 25 participants reported experiencing sexual assault by a family member or someone known; 25 participants reported experiencing an “other” traumatic event; 19 participants reported experiencing a serious accident, fire, or explosion; 17 participants reported experiencing sexual assault by a stranger; 11 participants reported experiencing a natural disaster; 10 participants reported experiencing non-sexual assault by a stranger; 10 participants reported experiencing a life-threatening illness; 8 participants reported experiencing imprisonment; 3 participants reported experiencing military combat or a war zone; and 2 participants reported experiencing torture.

Measures

The measures for the present study were selected on the basis of three interrelated factors: (1) use in previous smoking or anxiety disorder research, (2) empirical support for their psychometric properties, and (3) ability to measure the constructs of interest implicated in cognitive-affective vulnerability for PTSD and panic psychopathology.

Anxiety Disorders Interview Schedule for DSM-IV: Client Interview Schedule (ADIS-IV; Brown, Di Nardo, & Barlow, 1994)—The ADIS-IV is a semi-structured diagnostic tool used to assess DSM-IV anxiety, mood, somatoform, and substance use disorders as well as screen for the presence of psychotic disorders. Reliability of this measure has shown good to excellent inter-rater agreement for the majority of anxiety and mood disorders, including PTSD, among participants who were given two independent administrations of the ADIS-IV (Brown, DiNardo, Lehman, & Campbell, 2001). Blanchard, Gerardi, Kolb, and Barlow (1986), for example, found excellent sensitivity (1.0) and specificity (.91) for this instrument in regard to PTSD. The presence of current axis I psychopathology was assessed using the ADIS-IV in the present study. Reliability ratings by an independent rater (MJZ) were completed on a random selection of 20% of the protocols, with no cases of disagreement being noted.

Smoking History Questionnaire (SHQ; Brown, Lejuez, Kahler, & Strong, 2002)—

The SHQ is a self-report questionnaire used to assess smoking history and pattern. The SHQ includes items pertaining to smoking rate, age of onset of smoking initiation, and years of being a daily smoker (whether or not a person endorses smoking on a daily basis). The SHQ also assesses information regarding quit attempts, including withdrawal symptoms experienced during such attempts. The SHQ has been successfully used in previous studies (Zvolensky, Leen-Feldner et al., 2004; Zvolensky, Lejuez et al., 2004).

Fagerström Tolerance Questionnaire (FTQ; Fagerström, 1978)—

The FTQ was used as a continuous self-report measure of nicotine dependence. Specifically, the FTQ was administered and scored as the Fagerstrom Test for Nicotine Dependence (FTND). The FTND is a 6-item scale designed to assess gradations in tobacco dependence (Heatherton et al., 1991). Two items are rated on a four-point Likert-style scale (0–3); and four items are rated dichotomously (yes/no). The FTND has shown good internal consistency, positive relations with key smoking variables (e.g., saliva cotinine; Heatherton et al., 1991; Payne, Smith, McCracken, McSherry, & Antony, 1994), and high degrees of test-retest reliability (Pomerleau, Carton, Lutzke, Flessland, & Pomerleau, 1994).

Alcohol Use Disorders Identification Test (AUDIT; Babor, de la Fuente, Saunders, & Grant, 1992)—

The AUDIT is a 10-item self-report screening measure developed by the World Health Organization to identify individuals with alcohol problems (Babor et al., 1992). There is a large body of literature attesting to the psychometric properties of the AUDIT (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). In the present study, we computed two products from the AUDIT: (1) the frequency and quantity items were used to index current alcohol consumption (an average frequency-by-quantity composite score; Stewart, Zvolensky, & Eifert, 2001); and (2) the total score was employed to measure alcohol use problems (Babor et al., 1992).

Posttraumatic Diagnostic Scale (PDS; Foa, 1995; Foa, Cashman, Jaycox, & Perry, 1997)—

The PDS is a 49-item self-report instrument designed to assess the presence of posttraumatic stress symptoms, based on *DSM-IV* criteria (American Psychiatric Association [APA], 1994, 2000). In this study, the PDS was used to index the types of traumas experienced. Respondents reported if they have experienced any of 12 traumatic events, including an “other” category.

Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986)—

To assess sensitivity to, and discomfort with, anxious arousal, the 16-item ASI was employed. The ASI is a self-report measure on which respondents indicate, on a 5-point Likert-style scale (0 = *very little* to 4 = *very much*), the degree to which they fear the potential negative consequences of anxiety-related symptoms and sensations. The ASI has high internal consistency (Reiss et al., 1986), good test-retest reliability ($\kappa = .75$), and excellent convergent validity ($r > .70$) with other established anxiety-relevant measures (Peterson & Reiss, 1992; Zinbarg, Mohlman, & Hong, 1999). The ASI is unique from, and demonstrates incremental predictive validity to, trait anxiety (McNally, 1996). The ASI is made up of one higher-order factor (ASI-total score) and three lower-order factors: Physical, Psychological, and Social Concerns (Zinbarg et al., 1997). In the present investigation, the total score was employed as a global index of the construct.

Discomfort Intolerance Scale (DIS; Schmidt, Richey, & Fitzpatrick, 2006)—

The DIS is a 5-item self-report measure, rated on a 7-point Likert-type scale (0 = *not at all like me* to 6 = *extremely like me*), that was used to assess discomfort intolerance, or the ability to tolerate physically aversive stimuli. Factor analysis has shown that the DIS contains two lower-

order factors: Intolerance ($\alpha = .91$), comprised of two items, and Avoidance ($\alpha = .72$), comprised of three items. The Intolerance factor measures intolerance of discomfort and pain, and the Avoidance factor measures avoidance of physical discomfort. The DIS has shown strong criterion validation when tested in relation negative emotional symptoms (Schmidt et al., 2006; Schmidt & Lerew, 1998). In the present investigation, the DIS-total score was employed, as it reflects the global discomfort intolerance construct.

Anxiety Control Questionnaire (ACQ; Rapee, Craske, Brown, & Barlow, 1996)—

The ACQ is a 15-item self-report measure used to index perceptions of control over anxiety-related events. The ACQ was designed to index perceived control over internal and external events/situations that are relevant to anxiety-related problems. Participants indicate their level of agreement on a 6-point Likert-type scale (0 = *strongly disagree* to 5 = *strongly agree*) as relevant to various control-oriented beliefs (e.g., “When I am put under stress, I am likely to lose control”). Recent work on the ACQ yielded support for a three-factor lower-order solution (Emotion Control, Threat Control, and Stress Control) that loaded on a single 15-item higher-order factor (global Perceived Control; Brown, White, Forsyth, & Barlow, 2004). In the present investigation, as in past work (Gregor & Zvolensky, 2008), we utilized the revised global ACQ score (ACQ-total score) to index a generalized perception of control for anxiety-related events.

Positive Affect Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988)—

The PANAS is a 20-item measure on which respondents indicate, on a 5-point Likert-type scale (1 = *very slightly or not at all* to 5 = *extremely*), the extent to which they generally feel different feelings and emotions (e.g., “Hostile”). The PANAS is a well-established measure commonly used in psychopathology research (Watson et al., 1988). The scale assesses two global dimensions of affect: negative and positive; both subscales of the PANAS have demonstrated good convergent and discriminant validity as well as high levels of internal consistency (Watson, 2000) and good reliability (Watson et al., 1988). Only the negative affectivity scale (PANAS-NA) was used in the present study.

Mood and Anxiety Symptom Questionnaire (MASQ)—

The MASQ is a comprehensive measure of anxiety and depressive symptoms (Watson et al., 1995). This self-report instrument assesses mood dimensions important to the tripartite model. Participants indicate how much they have experienced each symptom (1 = *not at all* to 5 = *extremely*) during the past week. The Anxious Arousal scale (MASQ-AA) measures symptoms of somatic tension and arousal (e.g., “felt dizzy”). The Anhedonic Depression scale (MASQ-AD) measures a loss of interest in life (e.g., “felt nothing was enjoyable”) and reverse-keyed items measure positive affect. The MASQ shows excellent convergence with other measures of anxiety and depression and good discriminant validity for anxious versus depressive symptoms via the MASQ-AA and MASQ-AD scales, respectively (Watson et al., 1995). In the present study, the MASQ-AA scale was used to measure anxious arousal symptoms, and the MASQ-AD was used to measure depressive symptoms.

Procedure

Data for the current investigation were gathered at the baseline appointment, before the smoking cessation portion of the study in which participants made a self-guided quit attempt. In brief, during this baseline appointment, participants (1) first provided verbal and written informed consent, (2) completed a medical screen, (3) underwent a diagnostic evaluation (ADIS-IV) by a trained interviewer in order to determine inclusionary status and axis I diagnoses, and (4) completed an initial battery of self-report assessments, including those used in the present investigation. For all participants, the baseline evaluation occurred approximately two to three weeks prior to their scheduled quit day. All participants received \$25 for completion of the baseline assessment session; participation in all 8 appointments of the

longitudinal cessation study yielded a total compensation amount of \$225. Only the baseline data were used in the current study.

Data Analytic Plan

A multivariate analysis of variance (MANOVA) was employed to assess between-group differences among the PTSD, PD, PA, and C groups on the dependent variables of interest, which included anxiety sensitivity (ASI-total score), discomfort intolerance (DIS-total score), anxiety control (ACQ-total score), negative affectivity (PANAS-NA), anxious arousal (MASQ-AA), and anhedonic depression (MASQ-AD). Partial eta squared estimates were obtained as indices of effect size for significant group differences. *Post hoc* Tukey HSD comparison tests were conducted to assess differences among each of the four diagnostic categories. A Bonferroni correction was applied ($\alpha = .05/6 = .008$) to control for family-wise error rate across the six MANOVA procedures.

Results

Participant Characteristics

Means and standard deviations of key participant characteristic variables, including age, educational level, alcohol consumption, alcohol use problems, and number of co-occurring axis I diagnoses are published elsewhere; and groups did not differ on these characteristics (please see Marshall et al., 2008). The PTSD and PD groups did differ significantly in regard to number of trauma exposure types, with the PTSD group reporting a significantly greater number ($M = 3.80$, $SD = 2.11$) than the PD group ($M = 2.11$, $SD = 2.82$), $t(66) = 2.64$, $p = .01$.

Cognitive-Affective Variables

The MANOVA revealed significant group differences on ASI-total scores ($F = 43.05$, $p < .001$, $h^2 = .55$)¹. Specifically, the PTSD group reported significantly higher ASI-total scores than the PA and C groups (p 's $< .001$); and the PD group reported significantly higher ASI-total scores than the PA and C groups (p 's $< .001$). No other significant group differences were noted. Please see Table 1.

There were significant group differences in levels of discomfort intolerance (DIS-total score; $F = 5.44$, $p < .01$, $h^2 = .13$), such that the PTSD group reported significantly higher DIS-total scores than the PA ($p < .01$) and C ($p < .05$) groups. No other significant group differences were noted. Please see Table 1.

Significant group differences were evident in terms of levels of perceived control over anxiety-related events (ACQ-total score; $F = 5.30$, $p < .01$, $h^2 = .14$). Specifically, the PTSD group reported significantly lower ACQ-total scores than the PA group ($p < .05$); and the PD group reported significantly lower ACQ-total scores than the PA group ($p < .01$) and C group ($p < .05$). No other significant group differences were noted. Please see Table 1.

There were significant group differences in negative affectivity (PANAS-NA; $F = 32.86$, $p < .001$, $h^2 = .49$). The PTSD group reported significantly higher levels of PANAS-NA than the PA and C groups (p 's $< .001$); the PD group reported significantly higher levels than the PA and C groups (p 's $< .001$); and the PA group reported significantly higher levels than the C group ($p < .05$). No other significant group differences were noted. Please see Table 2.

¹The ASI subscales of Physical concerns, Psychological concerns, and Social concerns were also entered as criterion variables for the current analyses. The pattern and magnitude of results did not change significantly in either the pattern or magnitude of effect when investigating group differences in terms of the subscales. Specifically, individuals in the PTSD and PD groups reported significantly greater ASI-Physical ($F = 35.73$; $p < .001$; $h^2 = .51$), ASI-Psychological ($F = 17.16$; $p < .001$; $h^2 = .34$), and ASI-Social concerns ($F = 21.29$; $p < .001$; $h^2 = .39$) than the PA and C groups. No other significant group differences were noted.

Significant group differences were documented in terms of anxious arousal (MASQ-AA; $F = 16.79, p < .001, h^2 = .33$; see Table 2). The PTSD group reported significantly higher levels of MASQ-AA than the PA and C groups (p 's $< .001$); and the PD group reported significantly higher levels than the PA ($p < .01$) and C ($p < .001$) groups. No other significant group differences were noted. Please see Table 2.

Significant group differences in anhedonic depressive symptoms were observed (MASQ-AD; $F = 15.63, p < .001, h^2 = .32$). The PTSD group reported significantly higher levels of MASQ-AD than the C group ($p < .001$); the PD group reported significantly higher levels than the PA group ($p < .05$) and C group ($p < .001$); and the PA group reported significantly higher levels than the C group ($p < .05$). No other significant group differences were noted. Please see Table 2.

Discussion

No significant differences were observed between the PTSD and PD groups on any of the studied variables. These findings underscore the phenomenological similarities between these two clinical anxiety conditions across a relatively wide range of cognitive-affective variables. Smokers in these clinical groups, as compared to smokers in the PA and C groups, differed significantly in terms of several cognitive-affective variables, despite not differing from the comparison groups in descriptive smoking characteristics (e.g., smoking rate). First, as hypothesized, smokers in the PTSD and PD groups reported significantly greater levels of anxiety sensitivity than the PA and C groups. This finding is consistent with past work suggesting that individuals with PTSD and PD have an elevated fear of their internal anxiety-related sensations, as compared to many other mood and anxiety disorders as well as nonclinical samples (Rodriguez et al., 2004; Taylor, Koch, & McNally, 2002). Second, the PTSD group, but not the PD group, evidenced greater levels of discomfort intolerance than the PA and C groups, suggesting that smokers with PTSD have less tolerance for negative physical sensations. This finding has significant implications for better understanding smoking cessation processes among individuals with PTSD, given the established relations between tolerance of distress and cessation outcomes (Brown et al., 2002; Hajek, 1991). Third, the PTSD and PD groups reported significantly lower levels of perceived control over anxiety-related events than the PA group, and the PD group reported lower levels of perceived control than the C group. This finding suggests that smokers with PTSD and PD, as compared to the studied nonclinical comparison groups, perceive that they have lower levels of influence over their anxiety experiences. Such lower perceptions of control over anxiety-related events might be a cognitively-based mechanism associated with the higher rates of relapse and higher levels of cessation-related symptoms reported by these clinical populations (Marshall et al., 2008; Ziedonis et al., 2008), and therefore, it is worthy of further empirical study.

Fourth, smokers with PTSD and PD reported greater levels of negative affectivity than the PA and C groups, suggesting that at the trait level, these individuals are more prone to negative mood states. Individuals in the PA group also reported greater levels of negative affectivity than the C group, suggesting a gradation of severity for this particular vulnerability variable based on the severity of psychopathology reported. Fifth, individuals in the PTSD and PD groups reported greater levels of anxious arousal as compared to the PA and C groups. This finding is consistent with theoretical and empirical models of PTSD and PD psychopathology that have documented higher levels of hyperarousal symptoms among these clinical populations (e.g., Barlow, 2002; Blechert, Michael, Grossman, Lajtmán, & Wilhelm, 2007). Finally, the PTSD, PD, and PA groups evidenced greater levels of anhedonic depressive symptoms than the C group. The PD group also reported greater levels of anhedonic depressive symptoms than the C group. This finding is consistent with past work which has evidenced links between these clinical disorders and depressive symptoms (Kessler et al., 1994).

The present data suggest that smokers with PTSD and PD differ from PA and C smokers in terms of a wide number of cognitive-affective variables. Many of these cognitive-affective factors have direct linkages to poorer cessation outcomes (Ziedonis et al., 2008), and therefore, clinical smoking interventions might be well served by focusing, at least in part, on such factors to facilitate cessation, particularly among these anxiety disordered clinical groups. Additionally, as each of the studied cognitive-affective variables, which often are interrelated, is related to increased risk for more severe and problematic psychological outcomes (e.g., Brewin & Holmes, 2003; Hinton & Otto, 2006; Nixon & Bryant, 2005), the present data underscore that daily smokers with PTSD and PD are apt to experience high rates of psychological distress. Some of these cognitive-affective factors may serve as mediators or moderators in terms of relations between smoking and PTSD and PD, respectively.

The current study has a number of limitations. First, the current study is cross-sectional in nature; therefore, there is no information regarding the order of onset of the vulnerability characteristics, psychopathology, and smoking behavior. Future work could benefit from investigating these relations using prospective, longitudinal designs to better determine the temporal relations of the documented associations. Second, the current investigation was descriptive in nature and did not involve a manipulation of the variables studied. Future work attempting to alter these malleable vulnerability factors could investigate whether intervention (e.g., interoceptive exposure exercises) actually leads to greater success in quitting smoking and/or decreases in severity of PTSD and PD symptoms. Third, the current study utilized self-report data. Further work could usefully be carried out using alternative methodologies, such as laboratory tests of discomfort intolerance (e.g., breath-holding) or hyperarousal symptoms (e.g., carbon dioxide-enriched air paradigms) to decrease the potential contribution of method variance and more rigorously assess the constructs of interest. Fourth, the smokers studied in the current investigation reported relatively low levels of nicotine dependence. Future work could benefit from replication of the current findings among more nicotine dependent smokers. Fifth, the present sample, while recruited from the community, was enrolled as part of a larger study focused on making a self-guided quit attempt (quitting without psychosocial or pharmacological aids). It is therefore unclear how the observed differences across the studied anxiety disorders compare to samples of daily smokers seeking intervention to quit (or those not interested in quitting at all). In this same context, it would be advisable for future work to compare the studied groups to a non-smoking comparison. This type of comparison group would offer further insight into the nature and patterning of cognitive-affective vulnerability among smokers and non-smokers with and without anxiety psychopathology. Finally, the present study is limited in that it is comprised of a relatively homogenous sample in terms of race and ethnicity. To increase the generalizability of the current findings, it is important for future work to focus on more racially and ethnically diverse samples.

Overall, the present findings indicated that smokers with PTSD and PD report more severe levels of a number of cognitive-affective characteristics as compared to smokers with nonclinical PA or no psychopathology. This study provides an important step in better understanding the nature of cognitive-affective vulnerability among the smoking population.

Acknowledgments

This paper was supported by National Institute on Drug Abuse research grants (1 R01 MH076629-01, 1 R01 DA018734-01A1, and R03 DA16307-01) awarded to Dr. Michael J. Zvolensky, as well as a National Institute of Drug Abuse research grant (1 R03 DA00101-01) awarded to Dr. Laura E. Gibson. This paper was also supported, in part, by National Research Service Awards (1 F31 DA021006-01 and 1 F31 MH080453-01A1) granted to Anka A. Vujanovic and Erin C. Marshall, respectively.

This work was conducted in the Anxiety and Health Research Laboratory at The University of Vermont and approved by the Institutional Review Board at The University of Vermont. The views expressed here are those of the authors and do not necessarily represent those of the Department of Veterans Affairs.

References

- Acierno RA, Kilpatrick DG, Resnick HS, Saunders BE, Best CL. Violent assault, posttraumatic stress disorder, and depression: Risk factors for cigarette use among adult women. *Behavior Modification* 1996;20:363–384. [PubMed: 8875812]
- Acierno R, Kilpatrick DG, Resnick H, Saunders B, De Arellano M, Best C. Assault, PTSD, family substance use, and depression as risk factors for cigarette use in youth: Findings from the National Survey of Adolescents. *Journal of Traumatic Stress* 2000;13:381–396. [PubMed: 10948480]
- American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 4th ed.. Washington, DC: Author; 1994.
- American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 4th ed.. Washington, DC: Author; 2000. text revision
- Asmundson GJG, Stapleton JA. Associations between dimension of anxiety sensitivity and PTSD symptom clusters in active-duty police officers. *Cognitive Behaviour Therapy* 2008;37:66–75. [PubMed: 18470738]
- Babor, TF.; De La Fuente, MF.; Saunders, JB.; Grant, M. AUDIT—The Alcohol Use Disorders Identification Test: Guidelines for Use in Primary Health Care. Geneva, Switzerland: World Health Organization; 1989.
- Babor, TF.; De La Fuente, JR.; Saunders, J.; Grant, M. AUDIT: The Alcohol Use Disorders Identification Test. Guidelines for use in primary care. Geneva, Switzerland: World Health Organization; 1992.
- Barlow, DH. *Anxiety and its disorders: The nature and treatment of anxiety and panic*. 2nd ed.. New York: Guilford Press; 2002.
- Beckham JC, Roodman AA, Shipley RH, Hertzberg MA, Cunha GH, Kudler HD, Levin ED, Rose JE, Fairbank JA. Smoking in Vietnam combat veterans with posttraumatic stress disorder. *Journal of Traumatic Stress* 1995;8:461–472. [PubMed: 7582610]
- Bernstein A, Zvolensky MJ, Feldner MT, Lewis SF, Fauber AL, Leen-Feldner EW, Vujanovic AA. Anxiety sensitivity taxon and trauma: Discriminant associations for posttraumatic stress and panic symptomatology among young adults. *Depression and Anxiety* 2005;22:138–149. [PubMed: 16158414]
- Blanchard EB, Gerardi RJ, Kolb LC, Barlow DH. The utility of the Anxiety Disorders Interview Schedule (ADIS) in the diagnosis of post-traumatic stress disorder (PTSD) in Vietnam veterans. *Behaviour Research and Therapy* 1986;24:577–580. [PubMed: 3753385]
- Blechert J, Michael T, Grossman P, Lajtman M, Wilhelm FH. Autonomic and respiratory characteristics of posttraumatic stress disorder and panic disorder. *Psychosomatic Medicine* 2007;69:935–943. [PubMed: 17991823]
- Breslau N, Davis GC, Schultz LR. Posttraumatic stress disorder and the incidence of nicotine, alcohol, and other drug disorders in persons who have experienced trauma. *Archives of General Psychiatry* 2003;60:289–294. [PubMed: 12622662]
- Breslau N, Klein DF. Smoking and panic attacks: An epidemiologic investigation. *Archives of General Psychiatry* 1999;56:1141–1147. [PubMed: 10591292]
- Breslau N, Novak SP, Kessler RC. Daily smoking and the subsequent onset of psychiatric disorders. *Psychological Medicine* 2004;34:323–333. [PubMed: 14982138]
- Brewin CR, Holmes E. Psychological theories of posttraumatic stress disorder. *Clinical Psychology Review* 2003;23:339–376. [PubMed: 12729677]
- Brown, TA.; DiNardo, P.; Barlow, DH. *Anxiety Disorders Interview Schedule for DSM-IV*. Albany, NY: Graywind Publications; 1994.
- Brown TA, DiNardo P, Lehman CL, Campbell LA. Reliability of *DSM-IV* anxiety and mood disorders: Implications for the classification of emotional disorders. *Journal of Abnormal Psychology* 2001;110:49–58. [PubMed: 11261399]
- Brown RA, Lejuez CW, Kahler CW, Strong DR. Distress tolerance and duration of past smoking cessation attempts. *Journal of Abnormal Psychology* 2002;111:180–185. [PubMed: 11866171]
- Brown TA, White KS, Forsyth JP, Barlow DH. The structure of perceived emotional control: Psychometric properties of a revised anxiety control questionnaire. *Behavior Therapy* 2004;35:75–99.

- Buckley TC, Mozley SL, Bedard MA, Dewulf A, Greif J. Preventive health behaviors, health-risk behaviors, physical morbidity, and health-related role functioning impairment in veterans with post-traumatic stress disorder. *Military Medicine* 2004;169:536–540. [PubMed: 15291186]
- Davidson JR, Kudler HS, Saunders WB, Smith RD. Symptom and comorbidity patterns in World War II and Vietnam veterans with posttraumatic stress disorder. *Comprehensive Psychiatry* 1990;31:162–170. [PubMed: 2311383]
- Fagerstrom KO. Measuring degree of physical dependence to tobacco smoking with reference to individuation of treatment. *Addictive Behavior* 1978;3:235–241.
- Falsetti SA, Resnick HS. Cognitive-behavioral treatment for PTSD with panic attacks. *Journal of Contemporary Psychotherapy* 2000;30:163–179.
- Feldner MT, Babson KA, Zvolensky MJ. Smoking, traumatic event exposure, and posttraumatic stress: A critical review of the empirical literature. *Clinical Psychology Review* 2007;27:14–45. [PubMed: 17034916]
- Foa, E. Posttraumatic Stress Diagnostic Scale. Minneapolis, MN: National Computer Systems; 1995.
- Foa EB, Cashman L, Jaycox L, Perry K. The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment* 1997;9:445–451.
- Goodwin RD, Zvolensky MJ, Keyes KM. Nicotine dependence and mental disorders among adults in the USA: Evaluating the role of the mode of administration. *Psychological Medicine* 2008;38:1277–1286. [PubMed: 18366824]
- Gregor K, Zvolensky MJ. Anxiety sensitivity and perceived control over anxiety-related events: Evaluating the singular and interactive effects in the prediction of anxious and fearful responding to bodily sensations. *Behaviour Research and Therapy* 2008;46:1017–1025. [PubMed: 18675954]
- Hajek P. Individual differences in difficulty quitting smoking. *British Journal of Addiction* 1991;86:555–558. [PubMed: 1859918]
- Heatherton TF, Kozlowski LT, Frecker RC, Fagerstrom KO. The Fagerstrom Test for Nicotine Dependence: A revision of the Fagerstrom Tolerance Questionnaire. *British Journal of Addiction* 1991;86:1119–1127. [PubMed: 1932883]
- Himle J, Thyer BA, Fischer DJ. Prevalence of smoking among anxious outpatients. *Phobia Practice and Research Journal* 1988;1:25–31.
- Hinton DE, Hofmann SG, Pitman RK, Pollack MH, Barlow DH. The panic attack-posttraumatic stress disorder model: Applicability to orthostatic panic among Cambodian refugees. *Cognitive Behaviour Therapy* 2008;37:101–116. [PubMed: 18470741]
- Hinton D, Hsia C, Um K, Otto MW. Anger associated panic attacks in Cambodian refugees with PTSD: A multiple baseline examination of clinical data. *Behaviour Research and Therapy* 2003;41:647–654. [PubMed: 12732373]
- Hinton DE, Otto MW. Symptom presentation and symptom meaning among traumatized Cambodian refugees: Relevance to a somatically focused cognitive-behavior therapy. *Cognitive Behavioral Practice* 2006;13:249–260. [PubMed: 19823603]
- Johnson JG, Cohen P, Pine DS, Klein DF, Kasen S, Brook JS. Association between cigarette smoking and anxiety disorders during adolescence and early adulthood. *Journal of the American Medical Association* 2000;284:2348–2351. [PubMed: 11066185]
- Jones JC, Barlow DH. The etiology of posttraumatic stress disorder. *Clinical Psychology Review* 1990;10:299–328.
- Joseph S, Yule W, Williams R, Hodgkinson P. Increased substance use in survivors of the Herold of Free Enterprise disaster. *British Journal of Medical Psychology* 1993;66:185–191. [PubMed: 8353111]
- Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshleman S, Wittchen H-U, Kendler KS. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: Results from the National Comorbidity Survey. *Archives of General Psychiatry* 1994;51:8–19. [PubMed: 8279933]
- Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB. Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry* 1995;52:1048–1060. [PubMed: 7492257]
- Koenen KC, Hitsman B, Lyons MJ, Niaura R, McCaffery J, Goldberg J, et al. A twin registry study of the relationship between posttraumatic stress disorder and nicotine dependence in men. *Archives of General Psychiatry* 2005;62:1258–1265. [PubMed: 16275813]

- Lasser K, Boyd J, Woolhandler S, Himmelstein D, McCormick D, Bor D. Smoking and mental illness. *Journal of the American Medical Association* 2000;284:2606–2610. [PubMed: 11086367]
- Marshall EC, Zvolensky MJ, Vujanovic AA, Gibson LE, Gregor K, Bernstein A. Evaluation of smoking characteristics among community-recruited daily smokers with and without posttraumatic stress disorder and panic psychopathology. *Journal of Anxiety Disorders* 2008;22:1214–1226. [PubMed: 18282685]
- McCabe RE, Chudzik SM, Antony MM, Young L, Swinson RP, Zvolensky MJ. Smoking behaviors across anxiety disorders. *Journal of Anxiety Disorders* 2004;18:7–18. [PubMed: 14725865]
- McLeish AC, Zvolensky MJ, Bucossi MM. Interaction between smoking rate and anxiety sensitivity: Relation to anticipatory anxiety and panic-relevant avoidance among daily smokers. *Journal of Anxiety Disorders* 2007;21:849–859. [PubMed: 17166696]
- McNally RJ. Cognitive bias in the anxiety disorders. *Nebraska Symposium on Motivation* 1996;43:211–250. [PubMed: 8912310]
- McNally RJ. Anxiety sensitivity and panic disorder. *Biological Psychiatry* 2002;52:938–946. [PubMed: 12437935]
- McNally RJ. Panic and posttraumatic stress disorder: Implications for culture, risk, and treatment. *Cognitive Behaviour Therapy* 2008;37:131–134. [PubMed: 18470743]
- Morissette SB, Tull MT, Gulliver SB, Kamholz BW, Zimering RT. Anxiety, anxiety disorders, tobacco use, and nicotine: A critical review of interrelationships. *Psychological Bulletin* 2007;133:245–272. [PubMed: 17338599]
- Nixon RDV, Bryant RA. Induced arousal and re-experiencing in acute stress disorder. *Journal of Anxiety Disorders* 2005;19:587–594. [PubMed: 15749575]
- Orsillo SM, Weathers FW, Litz BT, Steinberg HR, Huska JA, Keane TM. Current and lifetime psychiatric disorders among veterans with war zone-related posttraumatic stress disorder. *Journal of Nervous and Mental Disease* 1996;184:307–313. [PubMed: 8627277]
- Otto, MW.; Reilly-Harrington, NA. The impact of treatment on anxiety sensitivity. In: Taylor, S., editor. *Anxiety sensitivity: Theory, research, and treatment of the fear of anxiety*. Mahwah, NJ: Lawrence Erlbaum Associates; 1999. p. 321-336.
- Patton GC, Carlin JB, Coffey C, Wolfe R, Hibbert M, Bowes G. Depression, anxiety and smoking initiation: A prospective study over 3 years. *American Journal of Public Health* 1998;88:1518–1522. [PubMed: 9772855]
- Payne TJ, Smith PO, McCracken L, McSherry C, Antony M. Assessing nicotine dependence: A comparison of the Fagerström Tolerance Questionnaire (FTQ) with the Fagerström Test of Nicotine Dependence (FTND) in a clinical sample. *Addictive Behaviors* 1994;19:307–318. [PubMed: 7942248]
- Perkonig A, Kessler RC, Storz S, Wittchen H. Traumatic events and post-traumatic stress disorder in the community: Prevalence, risk factors, and comorbidity. *Acta Psychiatrica Scandinavica* 2000;101:46–59. [PubMed: 10674950]
- Peterson, R.; Reiss, S. *Anxiety Sensitivity Index Manual, Revised*. Worthington, OH: International Diagnostic Systems; 1992.
- Pohl R, Yeragani VK, Balon R, Lycaki H, McBride R. Smoking in patients with panic disorder. *Psychiatry Research* 1992;43:253–262. [PubMed: 1438623]
- Pomerleau C, Carton S, Lutzke M, Flessland K, Pomerleau O. Reliability of the Fagerstrom tolerance questionnaire and the Fagerstrom test for nicotine dependence. *Addictive Behaviors* 1994;19:33–39. [PubMed: 8197891]
- Rapee RM, Craske MG, Brown TA, Barlow DH. Measurement of perceived control over anxiety-related events. *Behavior Therapy* 1996;27:279–293.
- Reiss S, Peterson RA, Gursky M, McNally RJ. Anxiety, sensitivity, anxiety frequency, and the prediction of fearfulness. *Behaviour Research and Therapy* 1986;24:1–8. [PubMed: 3947307]
- Rodriguez BF, Bruce SE, Pagano ME, Spencer MA, Keller MB. Factor structure and stability of the Anxiety Sensitivity Index in a longitudinal study of anxiety disorder patients. *Behaviour Research and Therapy* 2004;42:79–91. [PubMed: 14744525]

- Saunders JB, Aasland OG, Babor TF, de la Fuente JR, Grant M. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption – II. *Addiction* 1993;88:791–804. [PubMed: 8329970]
- Schmidt NB, Lerew DR. Prospective evaluation of psychological risk factors as predictors of functional impairment during acute stress. *Journal of Occupational Rehabilitation* 1998;8:199–212.
- Schmidt NB, Mitchell MA, Richey JA. Anxiety sensitivity as an incremental predictor of later anxiety symptoms and syndromes. *Comprehensive Psychiatry* 2008;49:407–412. [PubMed: 18555063]
- Schmidt NB, Richey JA, Fitzpatrick KK. Discomfort intolerance: Development of a construct and measure relevant to panic disorder. *Anxiety Disorders* 2006;20:263–280.
- State of Vermont Department of Health. 2007 [Retrieved June 30, 2007]. from <http://www.healthvermonters.info/>
- Stewart SH, Zvolensky MJ, Eifert GH. Negative-reinforcement drinking motives mediate the relation between anxiety sensitivity and increased drinking behavior. *Personality and Individual Differences* 2001;31:157–171.
- Taylor S, Koch WJ, McNally RJ. How does anxiety sensitivity vary across the anxiety disorders? *Journal of Anxiety Disorders* 1992;6:249–259.
- Watson, D. *Mood and temperament*. New York: Guilford Press; 2000.
- Watson D, Clark LA, Tellegen A. Development and validation of brief measures of Positive and Negative Affect: The PANAS scales. *Journal of Personality and Social Psychology* 1988;54:1063–1070. [PubMed: 3397865]
- Watson D, Clark LA, Weber K, Assenheimer JS, Strauss ME, McCormick Ra. Testing a tripartite model II: Exploring the symptom structure of anxiety and depression in student, adult, and patient samples. *Journal of Abnormal Psychology* 1995;104:15–25. [PubMed: 7897037]
- Ziedonis D, Hitsman B, Beckham J, Zvolensky MJ, Adler L, Audrain-McGovern J, Breslau N, Brown RA, George T, Williams J, Calhoun P, Riley W. Tobacco use and cessation in psychiatric disorders: National Institute of Mental Health (NIMH) Report. *Nicotine and Tobacco Research* 2008;10:1691–1715. [PubMed: 19023823]
- Zinbarg, R.; Mohlman, J.; Hong, N. Dimensions of anxiety sensitivity. In: Taylor, S., editor. *Anxiety sensitivity: Theory, research, and treatment of the fear of anxiety*. Hillsdale, NJ: Erlbaum; 1999.
- Zvolensky MJ, Bonn-Miller MO, Bernstein A, Marshall EC. Anxiety sensitivity and abstinence duration to smoking. *Journal of Mental Health* 2006;15:659–670.
- Zvolensky MJ, Feldner MT, Leen-Feldner EW, McLeish A. Smoking and panic attacks, panic disorder, and agoraphobia: A review of the empirical literature. *Clinical Psychology Review* 2005;25:761–789. [PubMed: 15975699]
- Zvolensky MJ, Gibson LE, Vujanovic AA, Gregor K, Bernstein A, Kahler C, Lejuez CW, Brown RA, Feldner MT. Impact of posttraumatic stress disorder on early smoking lapse and relapse during a self-guided quit attempt among community-recruited daily smokers. *Nicotine and Tobacco Research* 2008;10:1415–1427. [PubMed: 18686190]
- Zvolensky MJ, Leen-Feldner EW, Feldner MT, Bonn-Miller MO, Lejuez CW, Kahler C, et al. Emotional responding to biological challenge as a function of panic disorder and smoking. *Journal of Anxiety Disorders* 2004;18:19–32. [PubMed: 14725866]
- Zvolensky MJ, Lejuez CW, Kahler CW, Brown RA. Panic attack history and smoking cessation: An initial examination. *Addictive Behaviors* 2004;29:825–830. [PubMed: 15135567]
- Zvolensky MJ, Schmidt NB, McCreary BT. The impact of smoking on panic disorder: An initial investigation of a pathoplastic relationship. *Journal of Anxiety Disorders* 2003;17:447–460. [PubMed: 12826091]

Table 1
Between-Group Comparisons: Anxiety Sensitivity, Discomfort Intolerance, and Perceived Control over Anxiety-related Events

Variable	F value	Effect Size (η^2)	Mean (SD)	Observed Range	Significant Group Differences
Anxiety Sensitivity (ASI-total score)	42.48**	.56			PTSD > PA**; PTSD > C**
C			8.17 (5.07)	0 – 22	
PA			13.38 (8.22)	0 – 40	
PD			27.89 (8.60)	14 – 49	
PTSD			29.98 (11.62)	0 – 54	PD > PA**; PD > C**
Discomfort Intolerance (DIS-total score)	6.34*	.16			PTSD > PA*; PTSD > C [†]
C			11.10 (4.56)	1 – 21	
PA			9.35 (4.39)	3 – 20	
PD			12.11 (4.91)	6 – 24	
PTSD			13.96 (4.84)	6 – 25	
Perceived Control over Anxiety-Related Events (ACQ-total score)	5.30*	.14			PTSD < PA [†]
C			40.39 (5.56)	28 – 54	
PA			42.21 (3.86)	36 – 51	PD < PA [^] ; PD < C [†]
PD			37.39 (5.62)	28 – 48	
PTSD			38.00 (4.72)	28 – 46	

[†]Note: $p < .05$;

[^] $p < .01$;

* $p < .005$;

** $p < .001$

Between-Group Comparisons: Negative Affectivity, Anxious Arousal, and Anhedonic0020Depressive Symptoms

Table 2

Variable	F value	Effect Size (η^2)	Mean (SD)	Observed Range	Significant Group Differences
Negative Affectivity (PANAS-NA subscale)					
C	32.86**	.49			PTSD > PA**; PTSD > C**
PA			13.09 (3.22)	10 – 20	PD > PA [^] ; PD > C**
PD			17.21 (4.78)	10 – 27	PA > C [†]
PTSD			26.59 (5.66)	16 – 35	
			27.23 (8.28)	10 – 46	
Anxious Arousal (MASQ-AA subscale)					
C	16.79**	.33			PTSD > PA**; PTSD > C**
PA			20.57 (4.47)	17 – 33	PD > PA [^] ; PD > C**
PD			21.75 (6.61)	17 – 50	
PTSD			29.83 (8.45)	18 – 54	
			32.31 (10.32)	19 – 67	
Anhedonic Depression (MASQ-AD subscale)					
C	15.63**	.32			PTSD > C**
PA			49.83 (11.45)	31 – 72	PD > PA [†] ; PD > C** PA > C [†]
PD			57.54 (14.58)	32 – 88	
PTSD			66.26 (21.18)	30 – 96	
			68.57 (12.42)	40 – 93	

[†]Note: $p < .05$;

[^] $p < .01$;

* $p < .005$;

** $p < .001$