An Anxiety Sensitivity Reduction Smoking-Cessation Program for Spanish-Speaking Smokers (Argentina)

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The present study evaluated a Spanish-language version of an Anxiety Sensitivity Reduction Program for Smoking Cessation among a sample of daily adult smokers from Argentina (*n* = 6; *Mage* = 49.4, *SD* = 15.43) in an open trial methodological design. To be eligible, each participant expressed a current desire to quit smoking and previous difficulties with anxiety/mood symptoms during past quit attempts (e.g., anxiety, stress, depression, irritability). Participants completed a baseline assessment and received eight 90-minute weekly group sessions. The study involved one doctoral-level and two graduate-level therapists. Follow-up visits were scheduled at 1, 2, 4, 8, and 12 weeks post-quit day. Smoking status was confirmed biochemically and via self-report at quit day and each follow-up assessment. The treatment yielded positive results in terms of attendance, positive smoking cessation outcome (5 out of 6 were abstinent at 12-week follow-up), and significant reductions in anxiety sensitivity. The results suggest potential clinical utility among Spanish-speaking smokers for an anxiety-sensitivity smoking cessation program in regard to cessation outcome.

Smokers prone to psychiatric symptoms and conditions are a high-risk smoking subpopulation (Ziedonis et al., 2008). Among the various psychiatric symptoms and psychopathologies, depressive and anxiety symptoms and syndromes are highly prevalent in the general population and are comorbid with smoking (Leventhal, Ramsey, Brown, LaChance, & Kahler, 2008; Piper, Cook, Schlam, Jorenby, & Baker, 2011; Piper et al., 2010; Zvolensky, Bernstein, Yartz, McLeish, & Feldner, 2008). Among current smokers, negative emotional symptoms and disorders significantly increase risk of smoking cessation failure (Hall, Muñoz, & Reus, 1994; Hitsman, Borrelli, McChargue, Spring, &尼亚ura, 2003), heighten severity of tobacco withdrawal (Langdon et al., 2013; Leventhal et al., 2008), and contribute to maladaptive cognitive beliefs and cognitive-affective reactions to tobacco (Brandon, 1994; Peasley-Miklus, McLeish, Schmidt, & Zvolensky, 2012). For this reason, there is good reason to better understand and clinically target depression/anxiety symptoms and disorders in order to improve cessation outcome.

Although still limited in overall scope (see Richards, Cohen, Morrell, Watson, & Low, 2013, for a review), specialized treatments targeting depression/anxiety symptoms and disorders for smoking cessation have been developed (e.g., Feldner, Smith, Monson, & Zvolensky, 2013; Hertzberg, Moore, Feldman, & Beckham, 2001; MacPherson et al., 2010; McFall et al., 2010; McFall et al., 2005; Zvolensky, Lejuez, Kahler, & Brown, 2003). Yet, the results of these studies generally suggest rather modest improvements or even mixed results (e.g., Brown et al., 2007; Hitsman et al., 2003). Rather than focus primarily on depression/anxiety symptoms, others have suggested that there may be merit to identify and target transdiagnostic factors that are related to both anxiety and depression as well as other negative mood problems (e.g., anger) among smokers to facilitate cessation success (Zvolensky & Bernstein, 2005; Zvolensky, Schmidt, & Stewart, 2003). One promising line of inquiry in this domain has focused on the relations between anxiety sensitivity and smoking.

Anxiety sensitivity is a transdiagnostic factor implicated in the development and maintenance of panic and other emotional disorders (e.g., posttraumatic stress disorder; McNally, 2002; Taylor, 2003). This construct has been most commonly conceptualized as an individual difference factor related to sensitivity to aversive internal states of anxiety (Reiss, Peterson, Gursky, & McNally, 1986). Anxiety sensitivity is distinguishable empirically and theoretically from anxiety symptoms and other negative affect states (Rapee & Medoro, 1994; Zvolensky, Kotov, Antipova, &

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Schmidt, 2003). For example, anxiety sensitivity demonstrates incremental predictive validity relative to negative affectivity or trait anxiety in the prediction of anxiety symptoms (Zvolensky, Kotov, et al., 2003; Zvolensky, Lejuez, et al., 2003; Zvolensky, Schmidt et al., 2003). Moreover, numerous lines of research indicate that anxiety sensitivity significantly increases the risk for the future development of anxiety and depressive symptoms, panic attacks, and anxiety as well as other mood disorders (Hayward, Killen, Kraemer, & Taylor, 2000; Maller & Reiss, 1992; Marshall, Miles, & Stewart, 2010; Schmidt, Lerew, & Jackson, 1999; Schmidt, Zvolensky, & Maner, 2006).

Research also indicates anxiety sensitivity is related to smoking behavior. For example, anxiety sensitivity is positively correlated with smoking motives to reduce negative affect (Battista et al., 2008; Comeau, Stewart, & Loba, 2001; Leyro, Zvolensky, Vujanovic, & Bernstein, 2008; Novak, Burgess, Clark, Zvolensky, & Brown, 2003; Stewart, Karp, Pihl, & Peterson, 1997; Zvolensky, Bonn-Miller, Bernstein, & Marshall, 2006) and negative affect reduction expectancies (beliefs that smoking will reduce negative affect; Brown, Kahler, Zvolensky, Lejuez, & Ramsey, 2001; Gregor, Zvolensky, McLeish, Bernstein, & Morissette, 2008; Johnson, Farris, Schmidt, Smits, & Zvolensky, 2013). Recent research also suggests that anxiety sensitivity is predictive of greater increases in positive affect pre- to post-cigarette use (Wong et al., 2013) and that among high anxiety-sensitive smokers (relative to low anxiety-sensitive smokers), cigarette smoking after exposure to stressful situations reduces subjective anxiety (Evatt & Kassel, 2010; Perkins, Karelitz, Giedgowd, Conklin, & Sayette, 2010). From a cessation perspective, smokers higher relative to lower in anxiety sensitivity perceive quitting as more difficult (Zvolensky, Vujanovic, et al., 2007). Other work has identified that anxiety sensitivity may be related to more intense nicotine withdrawal during early phases in quitting (i.e., 1 week post-quit; Johnson, Stewart, Rosenfield, Steeves, & Zvolensky, 2012; Langdon et al., 2013; Marshall, Johnson, Bergman, Gibson, & Zvolensky, 2009; Vujanovic & Bernstein, 2009; Zvolensky, Lejuez, et al., 2004), but not necessarily withdrawal in later phases of quitting (Mullane et al., 2008). Higher levels of anxiety sensitivity are also related to greater odds of early lapse (Brown et al., 2001) and relapse during quit attempts (Assayag, Bernstein, Zvolensky, Steeves, & Stewart, 2012; Zvolensky et al., 2006; Zvolensky, Bernstein, et al., 2007; Zvolensky, Stewart, Vujanovic, Gavric, & Steeves, 2009). Importantly, the observed anxiety sensitivity-smoking effects do not appear to be explained by smoking rate, nicotine dependence, gender, other concurrent substance use (e.g., alcohol, cannabis), panic attacks, or traitlike negative mood propensity (Johnson et al., 2013; Wong et al., 2013).

Efforts have been made to target reductions in anxiety sensitivity to improve cessation outcomes. These efforts are guided by non-tobacco-oriented intervention programs for the prevention of anxiety/mood psychopathology; such programs have targeted anxiety sensitivity via psychoeducation, cognitive restructuring, and interoceptive exposure (Broman-Fulks & Storey, 2008; Gardenswartz & Craske, 2001; Schmidt et al., 2007; Vujanovic, Bernstein, Berenz, & Zvolensky, 2012). These anxiety-sensitivity-reduction techniques have subsequently integrated into smoking cessation programs for anxiety-prone smokers motivated to quit. For example, in the earliest study in this area, a 16-session integrated anxiety-sensitivity smoking-cessation treatment was found to successfully reduce anxiety sensitivity and was improved quit success (Zvolensky, Lejuez, et al., 2003). Controlled smoking cessation work found that a single-session intervention program can reduce anxiety sensitivity and facilitate reductions in smoking rate at 1-month follow-up (Feldner, Zvolensky, Babson, Leen-Feldner, & Schmidt, 2008). Based upon such work, an 8-session program for smokers high in anxiety sensitivity was developed, entitled the Anxiety Sensitivity Reduction Program for Smoking Cessation (Zvolensky, Yartz, Gregor, Gonzalez, & Bernstein, 2008). In general, the treatment applied cognitive restructuring and acceptance-oriented behavioral strategies as well as interoceptive exposure with a specific focus on reducing anxiety sensitivity, combined with evidenced-based behavioral counseling for smoking cessation (see Zvolensky, Yartz, et al., 2008; Zvolensky & Farris, 2012, for comprehensive session-by-session descriptions of the treatment). In a case series evaluation (n = 3), this program yielded significant reductions in anxiety sensitivity and facilitated smoking cessation success at 1-month follow-up (Zvolensky, Yartz, et al.).

In the present study, we evaluated an adapted version of Anxiety Sensitivity Reduction Program for Smoking Cessation to replicate and uniquely extend past work in four significant ways. First, we sought to complete an uncontrolled evaluation of the program with a 3-month follow-up. With consistent findings relative to past work (Zvolensky, Yartz, et al., 2008), this current test would further strengthen existing findings and set the stage for a larger, controlled clinical trial. Second, we sought to translate the treatment to the Spanish language and provide a cross-national test of the acceptability and clinical utility of the treatment program in South America (Argentina); no other cultural adaptations were made. This extension to the Spanish language from English is important because smoking rates are exceedingly high in South America generally and Argentina specifically (e.g., 29% prevalence in Argentina; World Health Organization [WHO], 2008). Moreover, a Spanish-language version of the treatment, with further cultural adaptation, could potentially be disseminated to other Spanish-speaking populations in other parts of the world.
responded to an advertisement to quit smoking. All disorder treatment (outpatient) clinic in Buenos Aires who reported they struggle with many varieties of negative affect when quitting (Zvolensky, Yartz, et al., 2008). Thus, we tested the treatment on smokers who were interested in quitting and also experienced significant emotional distress obstacles in past quit attempts. Finally, we added a telephone support component to treatment in which every 48 hours post-quit the therapist would contact the patient to provide direction/support in smoking cessation and alternative emotion regulation tactics. This decision was guided by clinical observation in the initial case series that additional social support and individually tailored feedback would be useful (Zvolensky, Yartz, et al.) and empirical findings suggesting telephone support can enhance cessation success (Free et al., 2011).

It was expected that the Anxiety Sensitivity Reduction Program for Smoking Cessation would facilitate abstinence due to decreased emotional vulnerability, as indexed by decreased (a) anxiety sensitivity; (b) negative emotionality as indexed by negative affectivity (generalized tendency to experience negative affect states; Watson, 2000); as well as (c) nicotine withdrawal severity (Hughes, Higgins, & Hatsukami, 1990). Formal comparisons were planned across three clinically and conceptually distinct time points: (a) from baseline to quit day (treatment phase change); (b) from 1 to 12 weeks follow-up (change over the course of follow-up); and (c) from baseline to 12-week follow-up (baseline to end of follow-up change). We expected the greatest clinically and statistically significant change to be evident from baseline to quit day and from baseline to follow-up assessments (a and c time points mentioned above). We did not expect meaningful change (stable) across follow-up assessments (time point b mentioned above), as the “active therapeutic element” would have occurred earlier in treatment with the present model and be maintained thereafter (Zvolensky, Yartz, et al., 2008).

Method

Participants

Participants were six adult smokers ($M_{age} = 50.7$, $SD = 14.15$, range $28 – 67$ years; 5 female) living in Buenos Aires, Argentina. Participants were self-referred to an anxiety disorder treatment (outpatient) clinic in Buenos Aires who responded to an advertisement to quit smoking. All participants expressed current motivation to quit smoking and indicated previous difficulties with anxiety/mood symptoms during past quit attempts (e.g., anxiety, stress, depression, irritability). No other recruitment or screening tactics were involved, nor were there any other inclusion/exclusion criteria. No participants had a current Axis I disorder (as determined through structured clinical interview). Half of the participants completed 4 years of college; one completed part of college and two completed primary schooling. Below, we provide (a) a detailed description of each participant and their smoking-based clinical presentation and then (b) a group-based summary of the cohort.

Participant 1 was a 41-year-old divorced female who reported smoking an average of 20 cigarettes per day and had been smoking regularly for the past 20 years (Fagerström Test for Nicotine Dependence [FTND] score = 7.0; moderate to high level of nicotine dependence). He reported two previous quit attempts (most recently 2 years ago), and endorsed significant withdrawal symptoms including weight gain, digestive problems, irritability, restlessness, anxiety, and cravings.

Participant 2 was a 51-year-old married male who reported smoking an average of 20 cigarettes per day and had been smoking regularly for the past 35 years (FTND score = 1.0; low nicotine dependence). He reported three previous quit attempts, with his most recent attempt about 1 year ago, which lasted approximately 9 months. During the attempt, he endorsed minimal withdrawal symptoms (only mild increased appetite).

Participant 3 was a 28-year-old single female who reported smoking an average of 7 cigarettes per day and had been smoking regularly for the past 14 years (FTND score = 0; no dependence). She reported four previous serious quit attempts, which lasted at most 10 days. During her most recent quit attempt (2 years ago), she endorsed experiencing moderate withdrawal symptoms including increased appetite and weight gain, restlessness, anxiety, and cravings.

Participant 4 was a 67-year-old married female who reported smoking an average of 15 cigarettes per day and had been smoking regularly for the past 45 years (FTND score = 2.0; low level of nicotine dependence). She reported seven serious previous attempts where she quit “cold-turkey,” with her most recent cessation attempt in the past year in which she was quit for 3 months. She endorsed significant withdrawal symptoms including digestive problems, depression/low mood, irritability, restlessness, anxiety, and cravings.

Participant 5 was a 60-year-old married female who reported smoking an average of 20 cigarettes per day and had been smoking regularly for the past 30 years (FTND score = 4.0; moderate level of nicotine dependence). She reported three previous quit attempts and has utilized
several quit strategies including “cold-turkey,” a smoking cessation program, acupuncture, and nicotine gum; however, she was quit for only 1 day during her most recent cessation attempt (approximately 1 year ago). She endorsed withdrawal symptoms including severe digestive problems, increase appetite, and weight gain.

Participant 6 was a 57-year-old widowed female who reported smoking an average of 15 cigarettes per day and had been smoking regularly for the past 21 years (FTND score = 5.0; moderate level of nicotine dependence). She reported two previous quit attempts, with her most recent attempt being 4 years ago and lasting 5 months. She endorsed significant withdrawal symptoms including increased appetite and weight gain, irritability, restlessness, and cravings.

Collectively, participants reported smoking an average of 14.5 cigarettes per day (SD = 4.64) and reported being a regular smoker for 27.5 years (SD = 5.11). The average age of first cigarette use was 14.5 years (SD = 1.22). The average FTND score was 3.2 (SD = 2.64), indicating low to moderate levels of nicotine dependence. Participants reported an average of 3.5 previous serious quit attempts (SD = 1.87) (i.e., a quit lasting over 24 hours) and indicated they utilized an average of 3.2 (SD = 1.47) different strategies to aid in the quit attempt (e.g., nicotine replacement therapy, behavior modification, gradual reduction, Bupropion). All participants endorsed the experience of withdrawal symptoms during their most recent quit attempt, and most frequently included digestive problems, increase appetite and weight gain, irritability, restlessness, and cravings.

Measures

The assessment battery was selected to assess three principal areas, including (a) demographics, tobacco use, and nicotine withdrawal; (b) sensitivity/tolerance for anxiety/bodily stress; and (c) negative affect. Spanish translations of all self-report assessments were utilized.

Demographics, Tobacco Use, and Nicotine Withdrawal

A Demographics Questionnaire was used that included items regarding participants’ education and treatment history for psychiatric and medical illnesses. The questionnaire was administered at baseline.

The Smoking History Questionnaire (SHQ; Brown, Lejuez, Kahler, & Strong, 2002) 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, years of being a daily smoker, and number of past quit attempts. The SHQ has been successfully used in previous studies as a measure of smoking history, pattern, and symptom-based problems during quitting (Zvolensky, Lejuez, et al., 2004; Zvolensky, Leen-Feldner, et al., 2004). The SHQ was administered at baseline.

The Fagerström Tolerance Questionnaire (FTQ; Fagerström, 1978) was used as a continuous self-report measure of nicotine dependence at baseline, and assesses gradations in tobacco dependence (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). Specifically, the FTQ (8-item measure) was administered and was scored as the FTND (6-item total score), which includes two items rated on a 4-point Likert-style scale (0–3) and four items 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). The Bedfont Micro III Smokerlyzer CO Monitor (Model EC50; Bedfont Scientific USA, Medford, NJ) was used as a biochemical verification of smoking status via analysis of expired carbon monoxide (CO) in breath samples. Research indicates that 8–10 ppm is an optimal cutoff score for reliably discriminating status as a daily smoker (Jarvis, Tunstall-Pedoe, Feyerabend, Vesey, & Saloojee, 1987; Morabia, Bernstein, Curtin, & Berode, 2001). The CO test was administered at baseline and each post-quit assessment.

A Timeline Followback (Sobell & Sobell, 1992) procedure was employed at the quit day appointment and at each of the follow-up appointments. Specifically, participants were asked about their daily smoking behavior following the cessation date, including whether or not they smoked each day. If they smoked, participants were asked to specify the number of cigarettes smoked per day. This method of tracking smoking has been used successfully in past work (McLeish, Zvolensky, & Bucossi, 2007).

The Minnesota Nicotine Withdrawal Scale (MNWS; Hughes & Hatsuakami, 1986, 1998; Hughes et al., 1984) assesses the experience of nicotine withdrawal symptoms. For each of the eight common nicotine withdrawal symptoms (frustration or anger/irritability, anxiety/nervousness, difficulty concentrating, restlessness/impatience, hunger, awakening at night, depressed or sad mood, and desire to smoke), respondents rate on a 5-point Likert-type scale (0 = none to 4 = severe) the degree to which the symptoms are currently experienced. The MNWS has demonstrated good validity and reliability in regard to examining withdrawal symptoms from cigarettes (Allen, Hatsuakami, Christianson, & Nelson, 1996; Hughes, Gust, Skoog, Kenman, & Fenwick, 1991). The MNWS was used in this study to index change in nicotine withdrawal symptoms at baseline and over the post-quit assessment.

Sensitivity of Anxiety and Bodily Stress

The Anxiety Sensitivity Index-III (ASI-3; Taylor et al., 2007) was employed to assess anxiety sensitivity. The ASI-3
is an 18-item self-report measure of the sensitivity to, and fear of, anxiety-related sensations. Respondents are asked to indicate, on a 5-point Likert-type scale (0 = not at all to 4 = very much) the degree to which they are concerned about possible negative consequences of anxiety-related sensations (e.g., “It scares me when I blush in front of people”). The ASI-3 has demonstrated sound internal consistency, test-retest reliability, and convergent validity as well as discriminant and criterion validity (Taylor et al.). The ASH-III was administered at baseline and each post-quit assessment to index change in anxiety sensitivity.

Negative Mood

The Positive Affect Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) assesses two global dimensions of affect: negative (PANAS-NA) and positive (PANAS-PA). For each of 20 adjectives (e.g., “irritable”), participants indicate on a 5-point Likert-type scale (1 = very slightly to 5 = extremely) the degree to which the descriptor typifies how they generally feel. Both the PANAS-NA and PANAS-PA have demonstrated good convergent and discriminant validity, as well as high levels of internal consistency (range of alpha coefficients: .83 to .90 and .85 to .93, respectively). A large body of literature supports the psychometric properties of the PANAS (see Watson, 2000). The PANAS-NA was used in this study to index the propensity to experience negative affect symptoms at baseline and each post-quit assessment.

Treatment Overview

The treatment program employs elements of cognitive–behavioral treatment of anxiety and elements of smoking cessation treatment tailored for daily smokers who have a history of emotional problems while quitting. We provide a detailed description of the core elements of the program; however, the manual itself can be attained by contacting the lead author.

Element 1: Therapeutic Rationale

Participants are provided with a comprehensive psychoeducational rationale for linkages between negative mood, emotional reactivity, and smoking. This task is conducted during Session 1. It is emphasized that due to the negative associations with one another, it is important to target these problems simultaneously in order to break “stubborn” smoking-negative mood relations. It is explained that in addition to “typical” smoking cessation treatment (e.g., monitoring cigarettes, use of the nicotine replacement therapies), the current treatment focuses on learning and practicing emotion regulation strategies that will help them to better manage, interpret, tolerate, and cope with emergent nicotine withdrawal and anxiety/bodily symptoms. Specifically, anxiety sensitivity is defined and illustrative smoking examples of interplay with smoking are offered.

It is then clarified how smoking can often be employed to regulate mood/bodily tension or stress in the short term (perceived or objectively or both). The process of the forward–feeding cycle is explained, whereby fears of anxiety/bodily sensations and perceived distress intolerance can lead to both subjective threat evaluations and heightened attention to threatening stimuli. It is explained that such experiences may “sensitize” a person to threat cues (i.e., makes them reactive). In this way, smoking can often be reinforced as an emotion regulation tactic for the management of anxiety/bodily tension and other negative mood states. For these reasons, (a) targeting the fear of anxiety, (b) improving tolerance for emotional/bodily distress, and (c) modifying such processes via acceptance-oriented emotion regulation exercises can be important in addressing smoking. In this context, the importance of practicing exposure exercises both in and out of session is emphasized. Specifically, an analogy to exercise is drawn whereby patients are reminded that to learn to run a marathon a person needs to practice running in smaller amounts first on a consistent basis. As in exercise, achieving success in smoking cessation can often be benefited by recurrent, consistent practice prior to a quit attempt.

Element 2: Decreasing Emotional Sensitivity to Anxiety/Bodily Stress and Increasing Tolerance for Such States

The second element in the treatment program involves using evidenced-based strategies originally developed for anxiety treatment programs to decrease emotional sensitivity and increase tolerance for aversive internal sensations (i.e., graduated exposure). This aspect of treatment is designed to gradually decrease emotional responsivity to threat-provoking cues that are directly relevant to their personal cessation effort, as is done in fear extinction paradigms (Bouton & Nelson, 1998). For example, a smoking-relevant exposure may include graduated smoking abstinence (to model exposure to nicotine withdrawal) and exposure to uncomfortable bodily sensations (e.g., straw breathing to elicit physiological arousal sensations). These graduated exposure exercises are done in a systematic and controlled manner, wherein emotionally corrective outcomes can be facilitated (e.g., by reminding participants that the sensations are not harmful, and correcting other maladaptive thoughts that may emerge during the exercises). The therapist coaches the patient through the exercise, prompting her/him to observe the sensations and their cognitive-affective reactions in a nonjudgmental manner (e.g., without reacting to them in a reflexive catastrophic fashion); presumably, this type of learning process offers patients a greater degree of
emotional tolerance and facilitates self-efficacy for abstinence.

Therapists combine cognitive restructuring strategies with mindfulness and cognitive distancing strategies to facilitate therapeutic exposure exercises and facilitate awareness of thoughts and cognitive distortions. Acceptance-based strategies are employed to foster increased cognitive diffusion (similar to cognitive distancing; Hayes, Strosahl, & Wilson, 1999) and willingness to experience unwanted quit-related thoughts, feelings, and bodily sensations without efforts to excessively control them; and thereby, increase tolerance for anxiety, withdrawal, and related sensations (Brown et al., 2008). Patients are explicitly taught that the goal of such therapeutic work is to learn that these internal cues can be successfully experienced without resorting to coping-oriented smoking behavior to control or reduce these sensations and unwanted (frightening) feelings/thoughts. Exposure to somatic and other interoceptive symptoms in advance of cessation ensures that participants have practice and experience with an alternative model of symptom management before the symptoms of smoking discontinuation are actually encountered during their quit attempt.

Beginning in Session 3, exposure exercises are described, demonstrated, and practiced in session. Moreover, individuals are instructed to practice the exercises outside of session. Specific exercises used are hyperventilation, chair spinning, stair climbing, head rolling, and straw breathing. However, if these exercises are not relevant for the person, different exposure tactics are employed that are personally relevant. Overall, patients are encouraged to practice those exercises that create the symptoms most relevant to their smoking experiences. The importance of varying practice contexts to facilitate the “unlearning” of emotional responsivity across settings is emphasized as a rationale for frequently practicing exercises out of session. The therapist pays particular attention to drawing a clear connection between aversive anxiety-related states and somatic changes, and discusses such experiences as they relate to changing smoking behavior (e.g., observing and being aware of thoughts/feelings during a cessation attempt and their role in motivating a smoking response). Once patients can identify and isolate bodily sensations, they are coached to change their cognitive reactions to these sensations by reframing them in more adaptive ways and accepting them as “normal and acceptable” rather than “dysfunctional” reactions. As described earlier, exposure intensity and relevance to cessation is driven by incorporating increasingly longer periods of smoking deprivation into the exposure exercises. For example, patients increase the time periods of smoking deprivation in order to get exposed to the aversive sensations (increasing the time between cigarettes up to 6 or more hours). In such a deprived state, the patient then completes interoceptive exposure exercises in session. The therapist frames this exposure to the patient as a “double dose” of stress exposure that may better prepare them for their quit attempt by mimicking the feeling of a powerful stressful event coupled with nicotine withdrawal.

Element 3: Specialized Smoking-Oriented Psychoeducation and Emotion Regulation Training in Session and With Weekly Between-Session Telephone Support

The final element of the treatment program provides evidence-based techniques for altering smoking behavior that is specifically adapted to a smoking population that has self-identified that emotional symptoms often impede their quit success. This component of the proposed treatment includes a variety of interrelated therapeutic tactics and procedures based in evidence-based smoking cessation treatment. In Session 1, a formal self-monitoring program for smoking in which participants track each cigarette they smoke through their quit day, noting situational and emotional cues for smoking urges, is presented. Also, past quit attempts are discussed as learning experiences and functionally analyzed to identify factors contributing to success and failure during previous attempts. Then, therapists work with the patient to identify idiographic high-risk situations for smoking urges, with a specific focus on anticipating both internal and external situations that make them want to smoke. We then help patients create and practice specific coping plans for such situations (e.g., drive to work without smoking) to gain positive success with them prior to quitting and address any unexpected issues prior to quit day. In Session 6, nicotine replacement therapy (NRT; using the transdermal nicotine patch) is introduced via psychoeducation and tailoring the NRT dose based on the participants’ smoking level. Participants can also choose to reduce their cigarette consumption prior to this time point. Quit day is set for Session 7, which occurs after the patient has demonstrated progress in exposure exercises, and presumably, increased resilience to anxiety and withdrawal sensations across varying contexts. During this session and beyond patients are using the transdermal nicotine patch.

Throughout the program, the therapist provides positive reinforcement and social support for quitting by congratulating participants for deciding to quit smoking, eliciting primary personal reasons for wanting to quit, providing written materials outlining the main points from each session, and reviewing the positive health benefits of quitting. Prior to quit day, they are instructed to remove tobacco products and stimuli (e.g., cigarettes, ashtrays, lighters) from their primary environments (e.g., home, workplace, car), and, where applicable, participants are encouraged to ask smokers in these environments to avoid offering them cigarettes. This activity removes unnecessary risks for lapse/relate to tobacco use. Prior to quit day, participants prepare a written Abstinence Plan worksheet. This plan consists of
an individualized list of behaviors the person will do prior to smoking (e.g., call a specific support person, go for a walk). Patients are asked to plan at least eight specific and reasonable items for the list, which they share with their therapist. They also write their top reasons for personally deciding to quit as an additional abstinence-reinforcing reminder during smoking urges, and they are instructed to keep a copy of this plan with them until the end of the program.

On quit day, therapists encourage participants to observe and monitor their quitting experiences, including degree of withdrawal symptoms, emotional distress, and the specific strategies used to avoid smoking. It is emphasized that anxiety/negative mood and withdrawal symptoms are opportunities to practice skill development rather than reasons to consider smoking to escape such feelings/sensations. Throughout the program, participants are encouraged to behave differently by accepting unpleasant experiences rather than inflexibly attempting to escape or avoid them. Starting on quit day, participants receive a phone call every 48 hours from the therapist to provide additional social support and individual guidance vis-à-vis emotional stress-smoking. These calls last about 10 to 15 minutes in length and are carried out from quit day through each of the follow-up assessments. Moreover, the patients are encouraged to provide daily updates to their therapists via daily phone check-ins to help keep them on track between weekly meetings as they desire from quit day through each of the follow-ups.

### Treatment Standardization

Each therapist had native Spanish fluency and was trained in the therapy during a 1-week time period. Treatment integrity was carried out through in-person training by the first author and weekly supervision by the second author. Across training and employment of the intervention, there was an explicit effort to maintain treatment standardization.

### Procedure

Upon arrival at the clinic, participants completed a written consent form and then a comprehensive baseline assessment (described in detail below). After completion of the baseline assessment (15 days before the start of treatment), participants were scheduled for group treatment. The treatment was conducted in eight 90-minute weekly group sessions, with quit day occurring on Session 7. Follow-up visits were scheduled at 1, 2, 4, 8, and 12 weeks post-quit day. At all time-points, smoking status was confirmed with a CO sample of expired air and the TLFB, and self-report assessments tapping the relevant emotion-tobacco constructs were collected. In the present study, abstinence was determined by the combination of self-reported abstinence via the TLFB and a CO expired breath sample of ≤ 3 ppm on quit day and each follow-up assessment. Participants were not reimbursed for their participation.

### Analytic Approach

Due to the methodological design, descriptive data are reported individually and as a group as well as graphed for visual inspection. Due to the nonnormal distribution of the data and the small sample size, Nonparametric Wilcoxon Signed-rank test with exact probability statistics was utilized to examine within-subject changes between time points (Mundry & Fischer, 1998; Siegel & Castellan, 1988); one-tailed Wilcoxon tests were employed due to the directional hypotheses. Monte Carlo simulation (10,000 samples) was used to estimate the 99% confidence intervals (p < .05 of the “null hypotheses”; Manly, 1991; Mooney, 1997). Formal comparisons were made across three clinically and conceptually relevant time points: (a) from baseline to quit day (treatment phase change); (b) from 1 to 12 weeks follow-up (change over the course of follow-up); and (c) from baseline to 12-week follow-up (pretreatment to end of follow-up change). Due to the small sample size, clinical significance was evaluated graphically and in the larger context of the Monte Carlo simulations.

### Results

#### Attendance

Eight sessions were completed over 8 weeks, which resulted in 100% of completed sessions (attendance). In case some participant missed a weekly session, she/he was immediately assigned an individual session that same week to ensure that all patients were moving forward at the same pace; a missed session occurred three times during the course of the study and all were rescheduled, as described above.

#### Smoking Outcome and Nicotine Withdrawal

All participants utilized NRT intervention and gradually reduced cigarette use prior to quit day. With regard to smoking cessation, all participants remained abstinent for the entire follow-up period (quit day to Week 12), with the exception of one participant. One participant (Case 6) reported a lapse to smoking at Week 1 post-quit day. Per the TLFB, a lapse occurred on days 8 and 9 post-quit day and which was biochemically confirmed (CO reading = 8 ppm). However, after these 2 days of smoking, the participant reported complete abstinence during the remaining follow-up period.

Nicotine withdrawal symptoms reduced after treatment and before quit day (see Figure 1). Nicotine
Figure 1. Changes in nicotine withdrawal, anxiety sensitivity, and negative affectivity during course of study.
withdrawal increased slightly at Week 1 follow-up. During follow-up, there was a significant gradual decline in nicotine withdrawal between Weeks 2 and 4 (\(Z = -2.03\), Exact \(p = 0.031\), 99% CI = 0.027, 0.036) and Weeks 4 and 8 (\(Z = -2.2\), Exact \(p = 0.016\), 99% CI = 0.012, 0.019). A slight rise in withdrawal symptoms was observed at Week 12 follow-up (see Tables 1 and 2). There was no noteworthy individual-level variability observed across follow-up assessments. There was a significant change from baseline to Week 12 follow-up for nicotine withdrawal symptoms (\(Z = -1.992\), Exact \(p = 0.031\), 99% CI = 0.026, 0.034).

### Anxiety Sensitivity

There was a significant change from pre- to postintervention in anxiety sensitivity (i.e., from baseline to quit day; \(Z = -2.2\), Exact \(p = 0.016\), 99% CI = 0.011, 0.017). There was no individual-level exception to this pattern (see Table 2). After a slight increase in anxiety sensitivity 1-week follow-up, there was no statistically significant change observed; however, there was a slight (visually detected) rise in anxiety sensitivity at Week 8 follow-up (see Figure 1). At individual level, the unexpected nonsignificant group-level increase of anxiety sensitivity at Week 8 appeared to be due to the large rise in anxiety sensitivity for Participant 5 (see Table 2). There was a significant change from baseline to Week 12 follow-up for change in anxiety sensitivity (\(Z = -2.032\), Exact \(p = 0.031\), 99% CI = 0.028, 0.037).

### Negative Affect

As measured via the PANAS-NA, no statistically significant change from pre- to postintervention was detected (see Tables 1 and 2). Thereafter, there was a visually detected group-level increase in negative affect observed at Week 1 and 2 follow-up, followed by a gradual decline until Week 8 (see Figure 1). There also was a small increase in negative affect at 12 weeks follow-up. Time point comparisons during the follow-up phase demonstrated a significant reduction in negative affect from Week 4 to 8 (\(Z = -1.992\), Exact \(p = 0.031\), 99% CI = 0.027, 0.036). There were no statistically significant differences between other time point comparisons and no noteworthy individual-level variability (see Tables 1 and 2). There was a significant change from baseline to Week 12 follow-up for negative affect (\(Z = -1.782\), Exact \(p = 0.047\), 99% CI = 0.041, 0.052).

### Discussion

In the present study, we evaluated a translated version of an 8-session Anxiety Sensitivity Reduction Program for Smoking Cessation among Spanish-speaking smokers from Argentina who had previous difficulties with anxiety/mood symptoms during past quit attempts using an open trial methodological design (Carroll & Nuro, 2002). The treatment yielded positive results in terms of attendance, as patients regularly attended appointments and actively engaged with the treatment material (i.e., completed each session). Moreover, positive outcomes were evident in regard to smoking cessation outcome. Specifically, all but one participant reported abstinence, as indexed by self-report and biochemical verification, at the 12-week follow-up assessment. Only one participant reported a smoking lapse. Also as expected, severity of nicotine withdrawal symptoms reduced after treatment and before quit day and from baseline to 12-week follow-up (see Figure 1). The change of symptoms from baseline to Week 12 and the reduction of symptoms at two of the time point comparisons across follow-up assessments were significant. These data replicate past positive smoking outcome findings observed at a 1-month follow-up for an earlier version of the treatment (Zvolensky, Yartz, et al., 2008) and uniquely extend such results to 3-month follow-up assessment among Spanish-speaking smokers.

Consistent with the focus and design of the treatment, results indicated significant reductions in anxiety sensitivity. Specifically, there was a significant reduction in anxiety sensitivity from baseline to postintervention and a significant change from baseline to Week 12 follow-up. Although there was a slight increase in anxiety sensitivity at 1-week follow-up (see Figure 1), as found in earlier work

### Table 1

<table>
<thead>
<tr>
<th>Measure</th>
<th>Baseline M</th>
<th>Baseline SD</th>
<th>Quit Day M</th>
<th>Quit Day SD</th>
<th>Week 1 M</th>
<th>Week 1 SD</th>
<th>Week 2 M</th>
<th>Week 2 SD</th>
<th>Week 4 M</th>
<th>Week 4 SD</th>
<th>Week 8 M</th>
<th>Week 8 SD</th>
<th>Week 12 M</th>
<th>Week 12 SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNWS-Total</td>
<td>12.7</td>
<td>4.50</td>
<td>12.0</td>
<td>4.73</td>
<td>13.3</td>
<td>4.13</td>
<td>11.5</td>
<td>3.15</td>
<td>9.5</td>
<td>2.66</td>
<td>6.0</td>
<td>2.97</td>
<td>6.7</td>
<td>4.18</td>
</tr>
<tr>
<td>ASI-3-Total</td>
<td>15.8</td>
<td>7.68</td>
<td>6.8</td>
<td>6.08</td>
<td>8.5</td>
<td>5.75</td>
<td>8.2</td>
<td>6.15</td>
<td>6.8</td>
<td>7.13</td>
<td>8.2</td>
<td>8.42</td>
<td>8.0</td>
<td>6.89</td>
</tr>
<tr>
<td>PANAS-NA</td>
<td>25.5</td>
<td>5.39</td>
<td>19.5</td>
<td>5.36</td>
<td>21.7</td>
<td>9.95</td>
<td>23.5</td>
<td>6.53</td>
<td>20.2</td>
<td>3.31</td>
<td>16.0</td>
<td>4.86</td>
<td>19.0</td>
<td>7.68</td>
</tr>
</tbody>
</table>

**Note.** MNWS-Total = Minnesota Nicotine Withdrawal Scale – Total score (Hughes & Hatsukami, 1986; possible range 0–27; observed range at baseline = 7–18); Anxiety Sensitivity Index-III – Total score (Taylor et al., 2007; possible range 0–72; observed range at baseline = 9–29); Positive and Negative Affect Scale – Negative Affect subscale (Watson et al., 1988; possible range 10–50; observed range at baseline = 16–32).
(Zvolensky, Yartz, et al., 2008), no statistically significant change across follow-up was observed. This slight increase in anxiety sensitivity at 1-week follow-up may be due to high degrees of interoceptive perturbation common to that phase of the quit experience (Hughes et al., 1990). Overall, the present data suggest change in anxiety sensitivity was

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Individual Change From Baseline Through 12-Week Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline Quit Day Week 1 Week 2 Week 4 Week 8 Week 12</td>
</tr>
<tr>
<td>Measure</td>
<td>Raw Z Raw Z Raw Z Raw Z Raw Z Raw Z Raw Z</td>
</tr>
<tr>
<td>MNWS-Total</td>
<td>13.0 0.07 15.0 0.63 14.0 0.16 16.0 1.43 12.0 0.94 6.0 0.00 14.0 1.75</td>
</tr>
<tr>
<td>ASI-3-Total</td>
<td>29.0 1.71 6.0 −0.14 4.0 −0.78 8.0 −0.03 4.0 −0.40 7.0 −0.14 7.0 −0.15</td>
</tr>
<tr>
<td>PANAS-NA</td>
<td>25.0 −0.09 18.0 −0.28 14.0 −0.77 26.0 0.38 23.0 0.86 24.0 1.65 31.0 1.65</td>
</tr>
</tbody>
</table>

Note. MNWS-Total = Minnesota Nicotine Withdrawal Scale – Total score (Hughes & Hatsukami, 1986); Anxiety Sensitivity Index-III – Total score (Taylor et al., 2007); Positive and Negative Affect Scale – Negative Affect subscale (Watson et al., 1988).
“produced” prior to quitting and maintained thereafter. These data add to a growing corpus of work that suggests clinically relevant change in anxiety sensitivity is associated with quit success (Assayag et al., 2012) and anxiety sensitivity reduction methods can be successfully integrated in that context (Feldner et al., 2013; Zvolensky, Lejuez, et al., 2003).

For negative affect, significant reductions in symptoms were detected from baseline to 12-week follow-up and from Week 4 to Week 8 post-quit. These findings, considered in context of the changes observed for anxiety sensitivity and design of the intervention, suggest some desynchrony between affect-relevant transdiagnostic processes such as anxiety sensitivity and negative emotional symptoms. For example, change was observed in anxiety sensitivity, but not negative affect, from baseline to postintervention. Such results are consistent with theoretical models of anxiety (Barlow, 2002; Chorpita & Barlow, 1998), clinical anxiety research (e.g., Bentley et al., 2013), and experimental psychopathology anxiety work (e.g., Schmidt & Lerew, 2002; Zvolensky, Eifert, & Lejuez, 2001) that suggest how one responds to distressing symptoms is not perfectly coupled with negative emotional symptom expression. Moreover, based on previous empirical evidence (Kahler et al., 2002; Mathew et al., 2013), the significant reduction in negative affect from Week 4 to Week 8 post-quit could be possibly be attributed to the successful cessation outcomes among participants rather than to the therapeutic effects of the anxiety sensitivity reduction program per se.

The current study has a number of limitations. First, it is an open trial, and therefore, in that, by definition, at an early stage of treatment development (Rounsaville, Carroll, & Onken, 2001). Consistent with Carroll and Nuro’s (2002) model for sequential treatment development, at the next stage, a randomized clinical trial is warranted. With a randomized trial, we would be able to isolate comparability of the treatment to standard care and explicate mechanisms of change. These studies are now ongoing in North America. Second, the sample size is small. Therefore, it is possible that there is limited generalizability of the results. Future work should utilize larger sample sizes to address this limitation. Third, due to the methodological design and sample size, we cannot explore time sequential effects. Thus, it is not possible to identify mechanisms of action. In future work, it would be helpful to identify temporal relations of theoretically relevant mechanisms of action. Fourth, we did not formally assess homework compliance, adherence, or acceptability of treatment via standardized instruments. Past work has indicated that greater homework compliance can increase smoking cessation success (Funk, Zvolensky, & Schmidt, 2011; Glasgow, Schafer, & O’Neill, 1981; Kamarck & Lichtenstein, 1988). Future research on this treatment program could, therefore, benefit by documenting the degree of homework compliance and how such behavior relates to smoking and emotional outcomes. Likewise, formally documenting adherence to the protocol and acceptability of the treatment would be useful next steps in refining the intervention. Fifth, there is a high-level of quit day and post-quit day telephone support. It is presently unclear how such support plays a role in the observed findings relative to other treatment elements. It will be important for future work to address the active elements in treatment using a randomized control design. Finally, although the present treatment was translated to Spanish, it does not necessarily mean that it would be equally applicable to all Spanish-speaking populations (e.g., Latino smokers). In fact, there was no major cultural adaptation of the present treatment outside of the language translation (English to Spanish). Future work could evaluate the present treatment in other Spanish-speaking populations in South, Central, and North America. In this context, qualitative data on the treatment experience would be useful to ascertain if greater cultural adaptability would be a useful addition in terms of acceptability/adherence (e.g., increasing family support). In this same context, we translated to the treatment, but did not engage in further individualization of the program. In clinical practice, it may be useful to further tailor the intervention so as to match it to the personalized needs of specific clients.

Overall, the present study provides novel empirical data on the Anxiety Sensitivity Reduction Program for Smoking Cessation among Spanish-speaking smokers who had previous difficulties with anxiety/mood symptoms during past quit attempts. The results suggest potential clinical utility of the anxiety sensitivity smoking cessation program in regard to cessation outcome.

Conflict of Interest Statement
The authors declare that there are no conflicts of interest.

References


