



## Intolerance for discomfort among smokers: Comparison of smoking-specific and non-specific measures to smoking history and patterns

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### HIGHLIGHTS

- ▶ Tolerance for discomfort measures have not been specific to smoking abstinence.
- ▶ A new measure assesses intolerance of smoking abstinence specifically.
- ▶ This study compares four non-specific measures to the smoking specific one.
- ▶ The smoking-specific measure was more highly related to past quit attempts.
- ▶ Smoking-specific intolerance for discomfort test may be more useful for practice.

### ARTICLE INFO

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### ABSTRACT

**Introduction:** Intolerance of discomfort associated with recent smoking cessation has been studied with only one smoking-specific questionnaire. The present study investigates the extent to which the previously validated Intolerance for Smoking Abstinence Discomfort Questionnaire (IDQ-S) scales share variance with (a) laboratory measures of distress tolerance (Paced Serial Addition Task and a breath-holding task) that have themselves been validated against smoking history, (b) the cold pressor task (not previously validated for smoking), and (c) an anxiety sensitivity questionnaire previously used for a similar purpose. The study then tests the hypothesis that the IDQ-S scales will have a higher correlation with smoking rate and dependence and with number and length of past smoking cessation attempts than with anxiety sensitivity or behavioral distress tolerance tasks do, since those measures are not smoking-specific.

**Methods:** Sixty daily smokers recruited from the community completed the measures.

**Results:** The behavioral tasks and anxiety sensitivity shared little common variance. Anxiety sensitivity correlated more highly with IDQ-S than did the behavioral tasks but only 27% of variance was shared with the IDQ-S Withdrawal Intolerance; no distress tolerance measure correlated significantly with the IDQ-S Lack of Cognitive Coping scale. Only the IDQ-S scales correlated significantly with nicotine dependence, rate and past cessation: Withdrawal Intolerance with nicotine dependence and rate, and Lack of Cognitive Coping with fewer quit attempts.

**Conclusions:** The smoking-specific measure of intolerance for discomfort may be more useful in smoking research than the less specific measures of distress tolerance.

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## 1. Introduction

### 1.1. Rationale for the study

Return to smoking is the outcome of a majority of smoking cessation attempts, usually occurring rapidly (Fiore et al., 2008). The aversiveness of tobacco withdrawal symptoms may be part of the reason for rapid relapse (Hughes, 2007). However, some characteristics of the individual smokers must also play a key role in early relapse. In particular, differential ability to endure or tolerate the discomforts of recent tobacco abstinence (withdrawal as well as other abstinence-related sources

*Abbreviations:* ASI, Anxiety Sensitivity Inventory; FTND, Fagerström Test for Nicotine Dependence; IDQ-S, Intolerance for Discomfort Questionnaire – Smoking; M, mean; PASAT, Paced Auditory Serial Addition Task; PVAMC, Providence Veterans Affairs Medical Center; SD, standard deviation.

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of stress) is likely to be one individual characteristic that impacts success (Sirota et al., 2010). While some patients in our smoking cessation programs report that they cannot tolerate how quitting smoking feels, others seem to suffer the discomfort with stoicism, or rationalize that the outcome will be worth the suffering. Ability or desire to endure unpleasant ongoing tobacco withdrawal symptoms and the loss of the use of cigarettes in other ways (handling, social bonding, etc.) may be low among some smokers. Assessing this ability may help identify those smokers who are at particularly high relapse risk.

In recent years, a related but more general construct, ability to tolerate distress in general, has been investigated in smoking research (Brandon et al., 2003; Brown, Lejuez, Kahler, & Strong, 2002; Brown, Lejuez, Kahler, Strong, & Zvolensky, 2005; Hajek, Belcher, & Stapleton, 1987). This approach grew from the observation that smokers who had difficulty holding their breath seemed to relapse quickly (Hajek et al., 1987). In a variety of studies with smokers, general distress tolerance has most commonly been operationalized as task persistence in physically or emotionally stressful behavioral laboratory tasks (Quinn, Brandon, & Copeland, 1996). The behavioral tasks involved unpleasant physical or psychological stressors. Such tasks have shown correlations with relevant smoking measures and predictive validity. Task persistence in breath-holding or inhaling carbon-dioxide-enriched air correlated with past early smoking lapse or relapse (Brown et al., 2002; Hajek, 1991; Hajek et al., 1987; West, Hajek, & Belcher, 1989), except in a study with low power (Zvolensky, Feldner, Eifert, & Brown, 2001) and predicted future smoking lapse (Brown et al., 2009). Persistence in emotionally stressful tasks also correlated with past (Brown et al., 2002) or future (Brandon et al., 2003) early return to smoking when using paced serial mental arithmetic or mirror tracing tasks but not when using frustrating anagrams. Thus, unwillingness to persist with physical or emotional stressors may indicate unwillingness to persist with the physical and emotional discomforts of smoking abstinence or of treatment. Such tasks, however, while useful in laboratory investigations, may often be difficult to use in clinical settings.

In addition to behavioral tasks, questionnaire measures have also been developed to index traits related to distress tolerance in general (e.g., Simons & Gaher, 2005) that may be relevant to smoking cessation. These measures involve the ability to tolerate feeling “distressed or upset” in general (Simons & Gaher, 2005), anxiety specifically (Zvolensky et al., 2006), or physical discomfort in general (Schmidt, Richey, & Fitzpatrick, 2006). The anxiety sensitivity measure has been shown to predict early lapse to smoking (Brown, Kahler, Lejuez, Zvolensky, & Ramsey, 2001; Zvolensky, Stewart, Vujanovic, Gavric, & Steeves, 2009), and the Distress Tolerance Scale correlates with nicotine dependence (Leyro, Bernstein, Vujanovic, McLeish, & Zvolensky, 2011). However, while negative emotions such as anxiety are relevant as relapse precipitants, these measures do not assess the ability to tolerate the set of specific physical, affective, and craving symptoms that occur during smoking withdrawal. Anxiety itself is only one of eight or nine valid types of withdrawal symptoms (Hughes, 2007; Hughes & Hatsukami, 1998; Hughes et al., 1999). Anxiety sensitivity may be less relevant to those more concerned about craving, depression, anger, fatigue, or other sequelae of abstinence. However, it may be that a general ability to tolerate distress is involved equally across a variety of types of emotional distress, and thus any index of ability to tolerate emotional or physical discomfort may predict smoking and smoking cessation.

The Intolerance for Smoking Abstinence Discomfort Questionnaire (IDQ-S) is the first measure designed to assess intolerance for the acute discomforts of recent smoking abstinence specifically (Sirota et al., 2010). It was developed in conjunction with questionnaires of intolerance for general physical or emotional discomfort more broadly in order to investigate the degree of shared variance

with these other aspects of tolerance for discomfort (Sirota et al., 2010). The IDQ-S was found empirically to consist of two reliable and valid components that intercorrelated only  $r = .27$ : withdrawal intolerance and cognitive coping (appraising the benefits to be worth the pain, reverse scored as “lack of cognitive coping” to keep the directions consistent). The IDQ-S, especially withdrawal intolerance, was more highly correlated with smoking rate, dependence, and length of past quit attempts than the IDQ measures of tolerance for general emotional or physical discomfort were (Sirota et al., 2010). While all three IDQ measures were found to be valid in relationship to other measures of distress and emotional reactivity, only the IDQ-S showed a consistent relationship to smoking measures and to the number and length of past smoking quit attempts.

Intolerance for the discomfort of smoking abstinence is not the same as experiencing or expecting withdrawal any more than anxiety sensitivity is the same as anxiety. Instead, the IDQ-S assesses people's beliefs about their willingness or ability to experience such distress, and these beliefs while still smoking are likely to affect their willingness to try to quit smoking as well as their success in quitting. As such, the IDQ-S should be a useful clinical tool, unlike the behavioral measures. The degree to which a smoking-specific measure is more useful in practice and in research than a non-specific measure of tolerance for discomfort requires investigation. In addition, the correlation with other measures used in research to assess distress tolerance is also important to establish so as to advance research methodologies. The first step is to determine whether the IDQ-S has a stronger correlation with smoking history and dependence measures than do measures of physical or emotional distress tolerance.

## 1.2. Aims of the study

The first purpose of this study is to determine the extent to which the IDQ-S correlates with relevant laboratory measures of distress tolerance that have previously been used in smoking research, and with the anxiety sensitivity measure, which was the only questionnaire to have been used for a similar purpose in smoking research when the study started. The IDQ-S scales have already been validated already against the same smoking variables used to validate these other distress tolerance measures (Sirota et al., 2010). The present analyses are intended to determine the amount of shared variance (e.g., the square of the correlation coefficient) among these distress tolerance measures. If collinear, there might be no need for a laboratory measure if a questionnaire would measure the same construct, and no need for an anxiety measure if a smoking-specific measure would do. Three behavioral tasks that have been used as indicators of unwillingness to persist with physical or emotional stressors were chosen for testing to minimize conceptual overlap. The one frustration task with the strongest support (paced serial mental arithmetic) and the physical task with a demonstrated relationship to smoking relapse (breath-holding) were selected. In addition, a physical measure of willingness to tolerate pain not previously investigated in relationship to smoking variables (cold pressor task) was chosen due to its high conceptual relationship to distress intolerance.

The other aim is to test the hypothesis that the IDQ-S will have a higher correlation with number and length of past smoking cessation attempts than anxiety sensitivity or the three behavioral tasks do. Since the IDQ-S is easier and less costly for clinicians to use than are behavioral tasks, if it is at least as good an indicator of past success in quitting smoking and therefore in likelihood of success, this would support using the IDQ-S. Due to the specificity of the IDQ-S to smoking, it seems likely to show a higher correlation with smoking history than would less specific assessments.

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